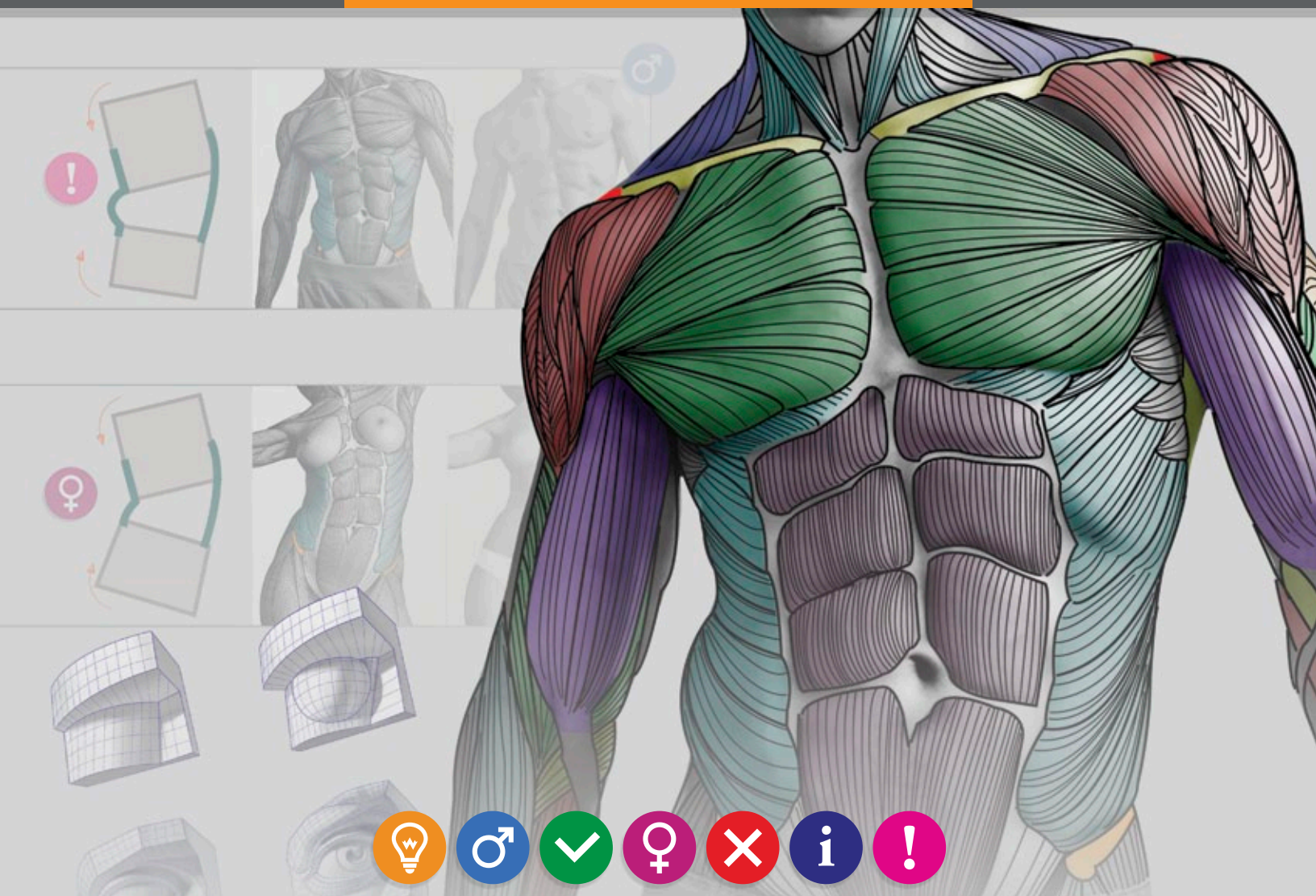
ULDIS ZARINS
WITH
SANDIS KONDRATS

ANATOMY FOR SCULPTORS

UNDERSTANDING THE HUMAN FIGURE



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2014

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ABOUT, HISTORY, BACKGROUND

High Hopes

At the beginning of the 1990s, on the ruins of the USSR, in the newly formed Latvian nation, a young person, named Uldis Zarins, full of ideals and hopes, dreamed of becoming a sculptor. In 1994, he was accepted to the Art College of Riga. Studies were difficult and competition was fierce, but they resulted in satisfaction. Every day he replicated famous classical Greek portraits, busts, and figures in clay. The outlook prevailed, that frequent replication of antique sculptures would facilitate the understanding of form creation. After only half a year, Uldis understood that eyes, of course, adapt, and hands become more agile; however, understanding of the form did not materialize.

The Cheek of the Amazon

One day, when replicating the head of the Amazon portrait of famous sculptor Polykleitos, he ran into a problem: How to construct a cheek? It was clear that the form was not just a sphere, but several complicated forms combined. He thought: “It would be great to understand what these forms are and how they go together!”
Teachers only discouraged, saying: “Study, research, measure!” – But what to measure, when there aren’t even any corners, nor facets!? A teacher answered: “Study anatomy, maybe you’ll get by somehow.”

First Anatomy Studies

A modeling teacher told Uldis: “If you want to understand everything, here is a human skull and anatomy book. Study and create an écorché for us!” Uldis decided to create a bust with shoulders. All of its muscles were in place, however, the sculpture looked bad. The main thing was that his understanding of the form had not increased one bit! In the place of the form, he had studied muscles.
In digging through a mountain of anatomy books, Uldis realized that they were all meant for painters and drawers. He found that all of these books were equally boring, with scant, chaotic drawings. “No one, it turns out, has thought about sculptors!” Uldis found only one anatomy book, which only slightly touched on the form -- Gottfied Bammes’ Der nackte Mensch. Then he asked himself the question: “Why are there so few pictures in the books and so much text!”

Academy Studies

After college, Uldis enrolled in the Art Academy of Latvia (Latvijas Makslas Akademija). There, same as in college, emphasis was placed on exercises, not on the understanding of how to create the form. Each time Uldis created a new sculpture, he made preparations, not only to arrange the frame and the edge, but also drew a small paper sketch where he could analyze the form in an understandable way.

Over the course of several years, drawings, sketches, anatomy books and successful photographs were accrued. Uldis began to notice, that the sketches he had created, as well as images, were in high demand among colleagues. He often heard the suggestion that he should collect them all and publish a book, which would be a composite of form analysis, as well as fundamental information about anatomy that sculptors would need to know. This was how Uldis came up with the idea for the creation of the book.

Kickstarter

Years went by and Uldis created the website anatomy4sculptors.com, a proportion calculator, and Facebook page, where he publishes anatomy reference images and his drawings. On the Facebook page, Uldis engaged in conversations and tested the ways of explaining the human anatomy. In the spring of 2013, with the help of friend Sandis Kondrats, a Kickstarter campaign was organized, creating an international team, with whose help Uldis realized his dream of publishing the book, Anatomy for Sculptors. During the project development phase, Sandis and Uldis were joined by friends from Latvia, Sabina Grams and Edgars Vegners, who contributed with their expertise in Graphic Design and Photography. With much help from Sandis’ brother Janis Kondrats, we were able to create a unique subscription system on the website to engage and test the book's content with the project supporters. As English is a second language for Uldis and Sandis, the assistance of editors and proofreaders, Monika Hanley and Johannah Larsen, was indispensable. Friendships, created through the project with Chris Rawlinson and Sergio Alessandro Servillo, filled in the blanks with 3D scans and sculpt reference materials. The Shutterstock service, which supplied Uldis with a lot of great artwork to build on the book’s content, was also a great help. Thanks to the friends of the international sand sculpting community, with whom Uldis and Sandis had conversations about the book during their travels over the course of the year, which was a great help in the book’s development process. The support of the Seattle Latvian community was very special while working on the project. Also, without the support and understanding of the families and friends of Uldis and Sandis, this project would not have been possible.

Finally, the book has come into physical form after hard and passionate work over the course of 20 years, since Uldis came up with the dream of creating such a book. It took him 11 years of classical art studies, over 200 international sculpting festivals, symposiums and exhibitions in 9 years and the past 4 years spent on reading books, researching human anatomy, and creating illustrations for this book to come to life.

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THANKS TO

KICKSTARTER

AND 384 SUPPORTERS FROM ALL OVER THE WORLD!

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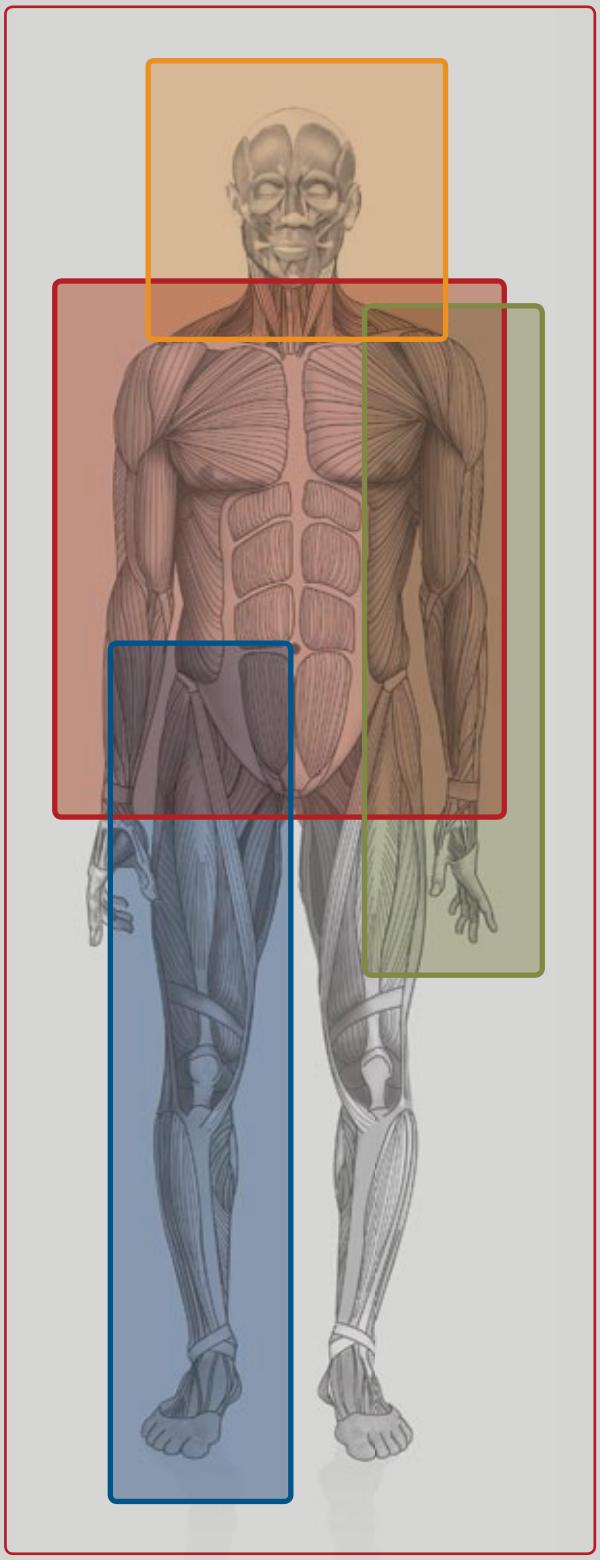

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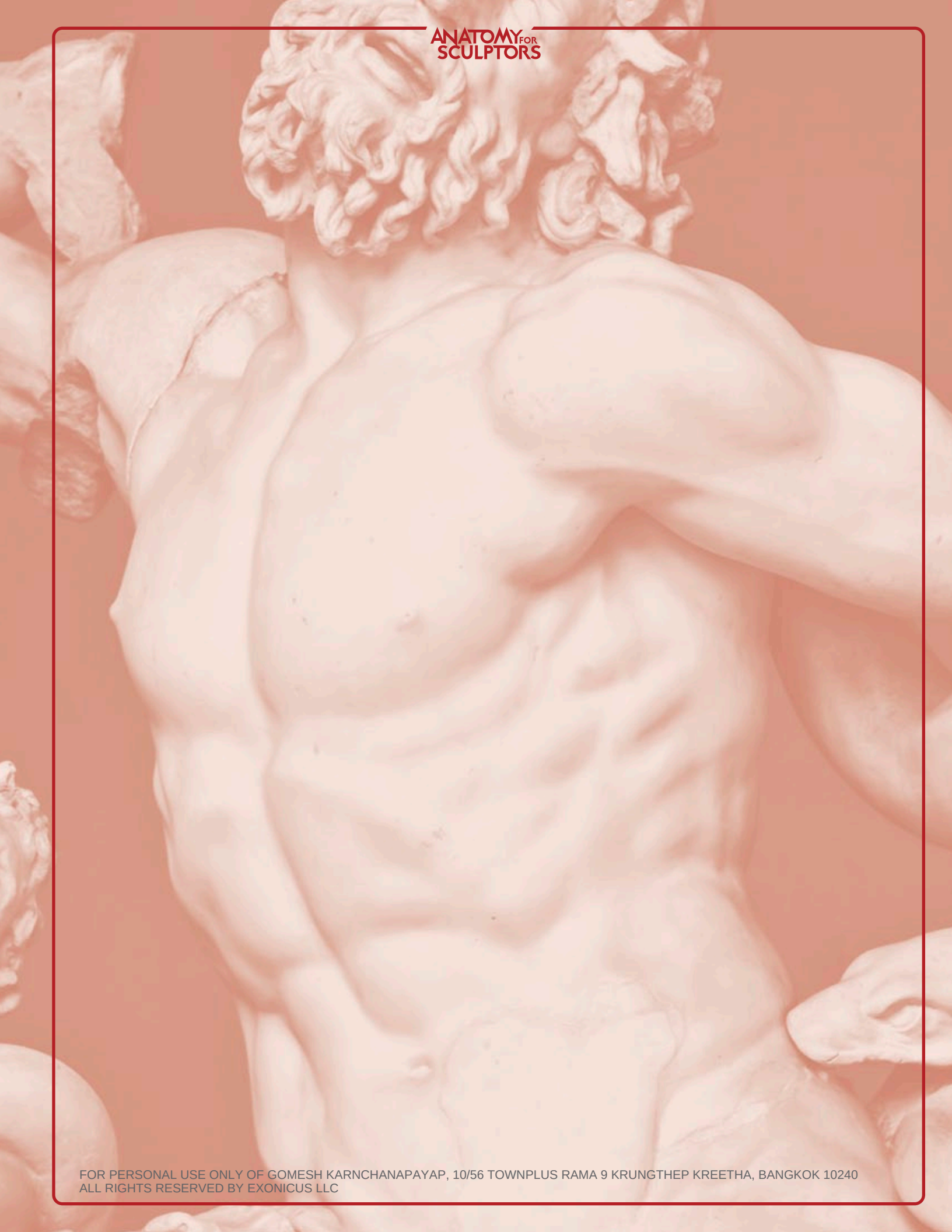

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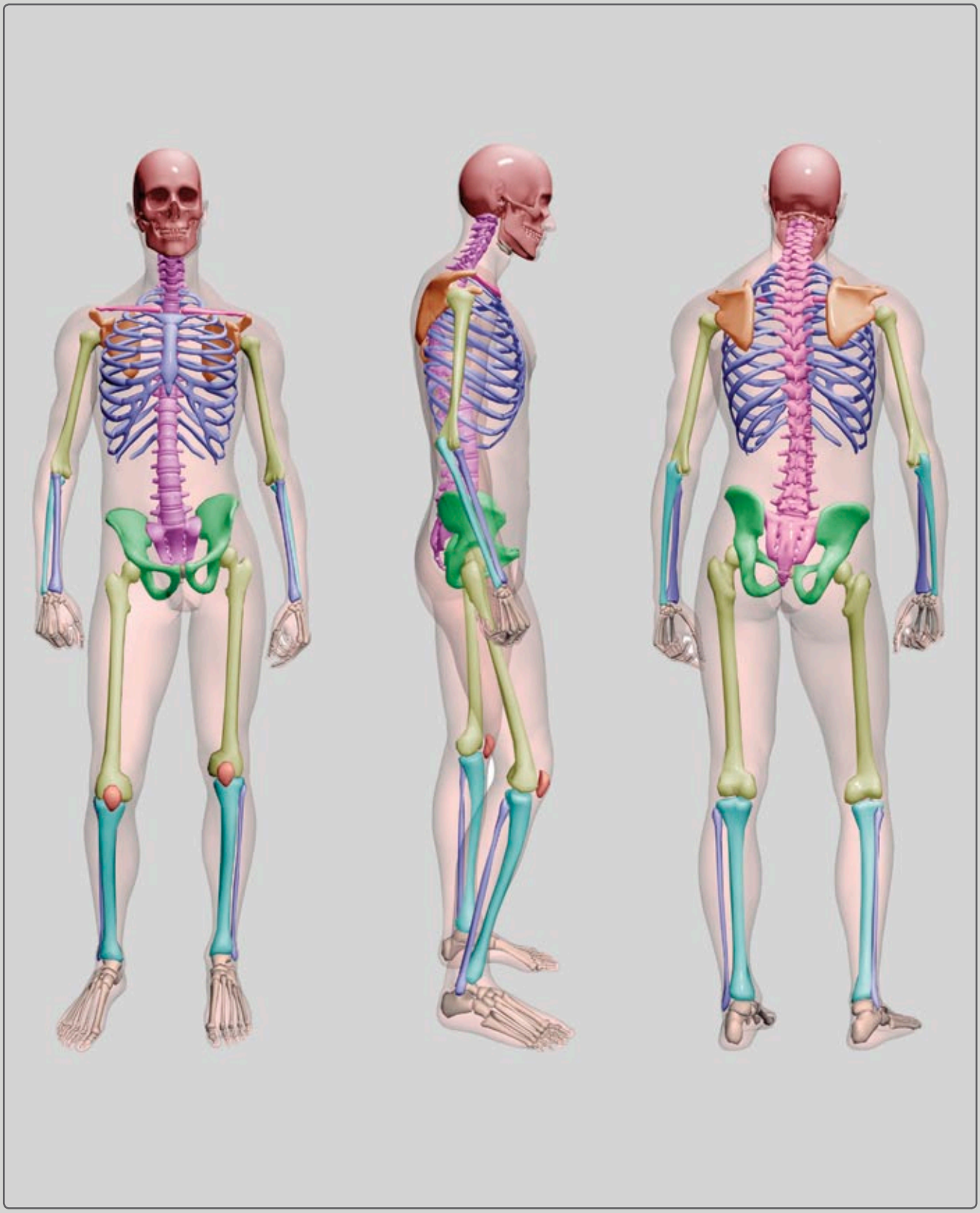
HUMAN SKELETON



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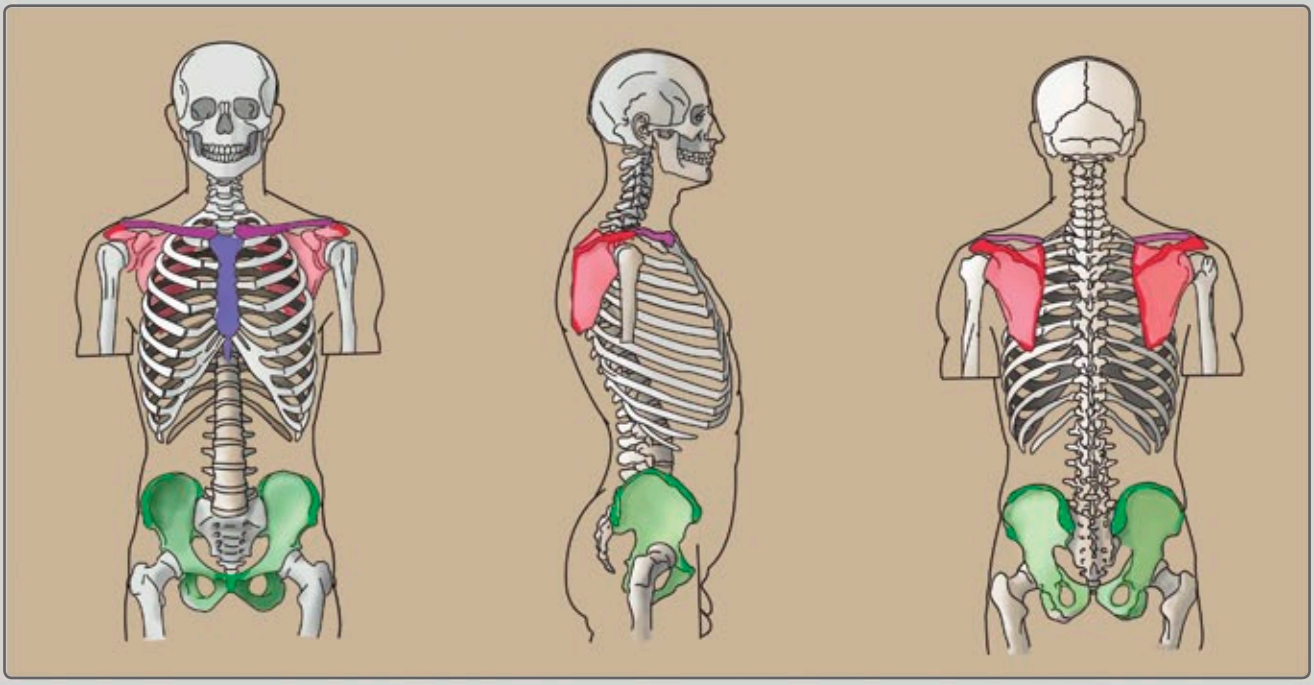
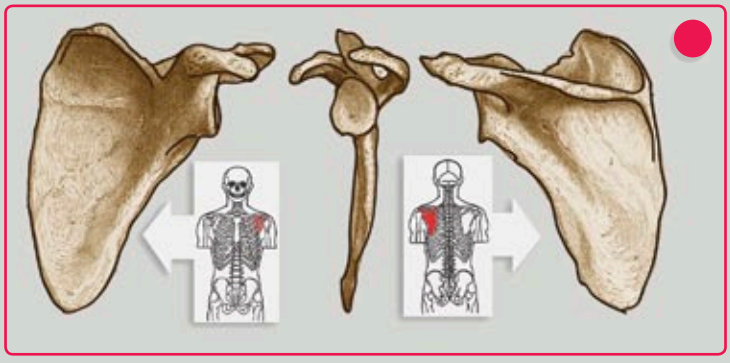
IMPORTANT LANDMARKS OF TORSO

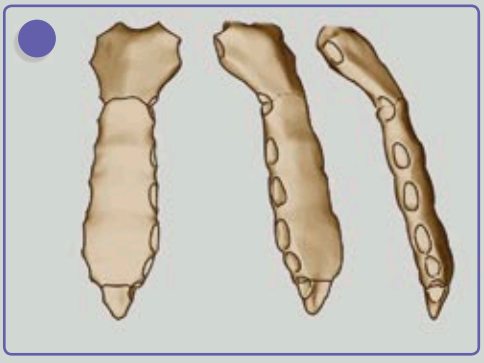
PROMINENT SUBCUTANEOUS PROTRUSIONS – GENERALLY POINTS OF BONE, THOUGH SOMETIMES FORMED BY ENTIRE BONES, ARE CALLED BONY LANDMARKS OR SIMPLY LANDMARKS. THEY MAY SERVE AS IMPORTANT PROPORTIONAL MEASURING POINTS OF THE BODY. LANDMARKS ARE THE KEY TO UNDERSTANDING THE EXACT POSITION OF THE ENTIRE SKELETON, WHICH FOR THE MOST PART IS EMBEDDED IN THE SOFT TISSUES OF THE BODY.



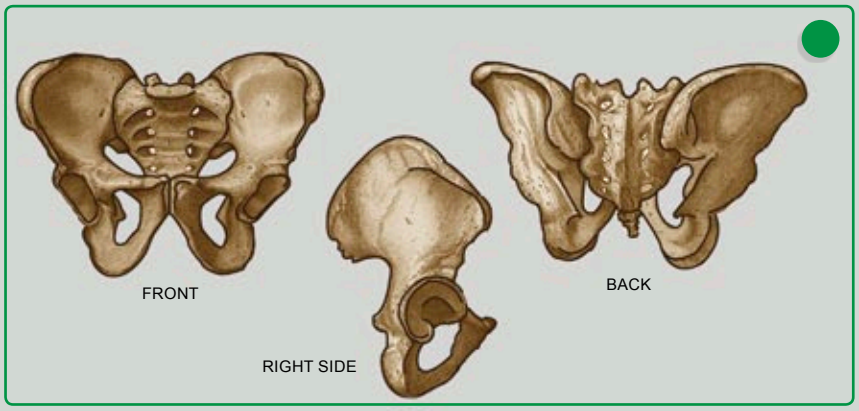
SHOULDER BLADE (SCAPULA)



CHEST BONE (STERNUM)



PELVIS



CLAVICLE

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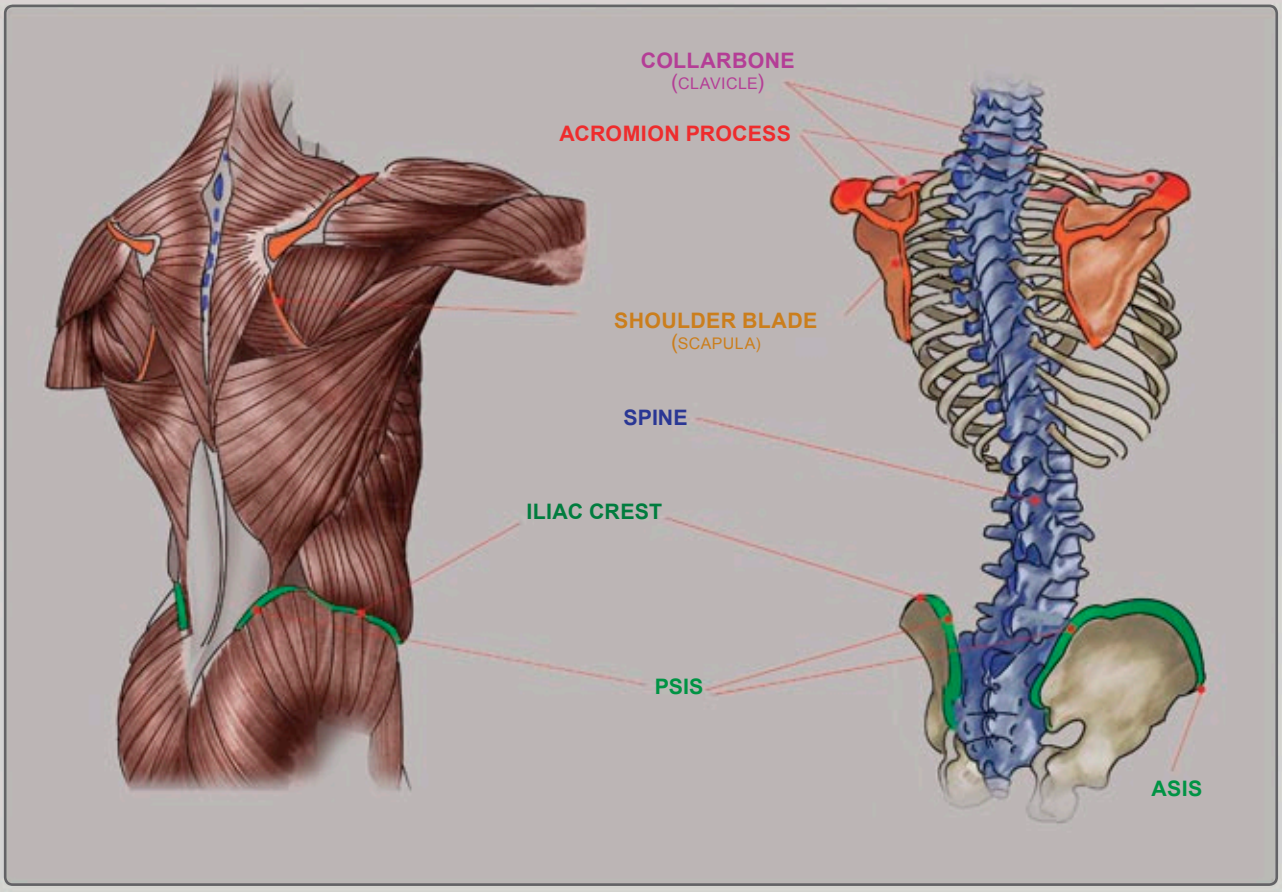
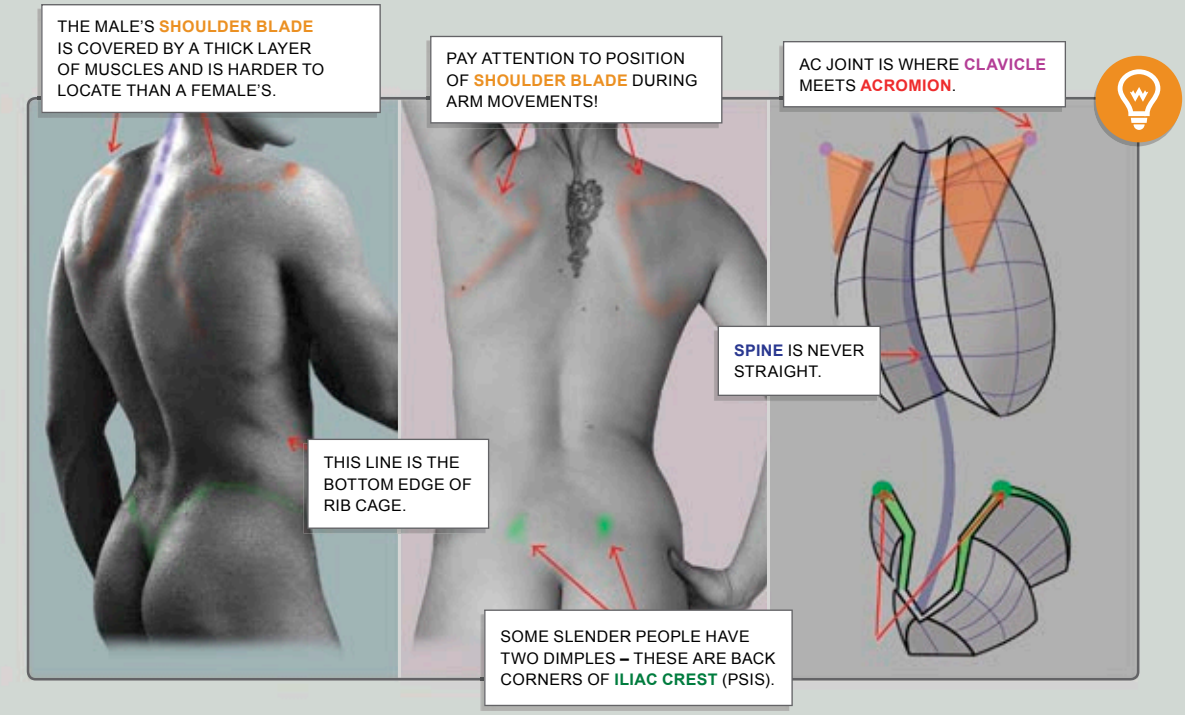
MAIN LANDMARKS OF BACK OF THE TORSO





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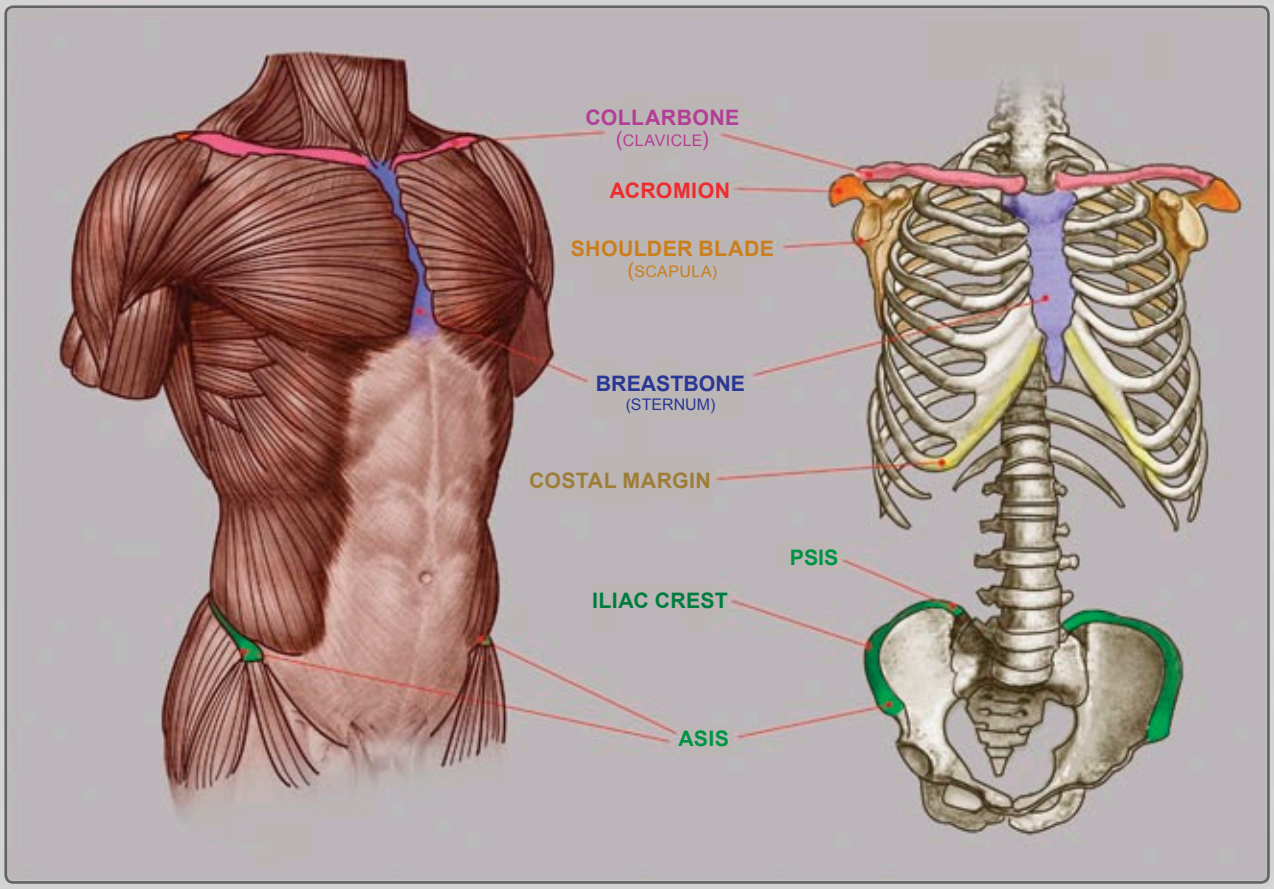
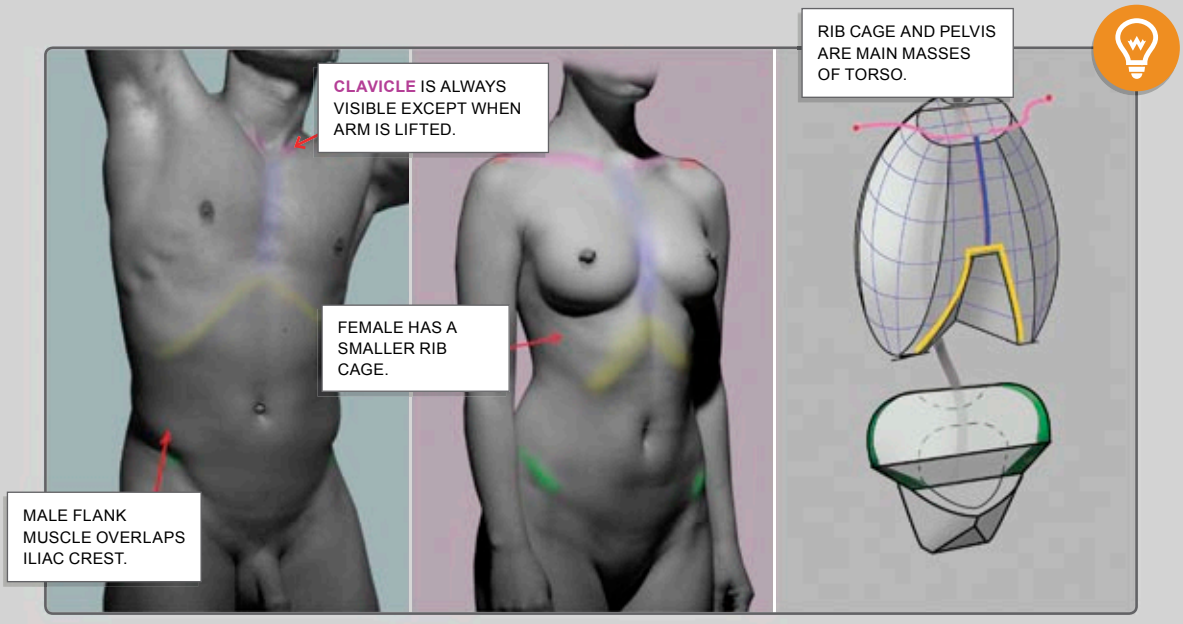
MAIN LANDMARKS OF FRONTAL TORSO





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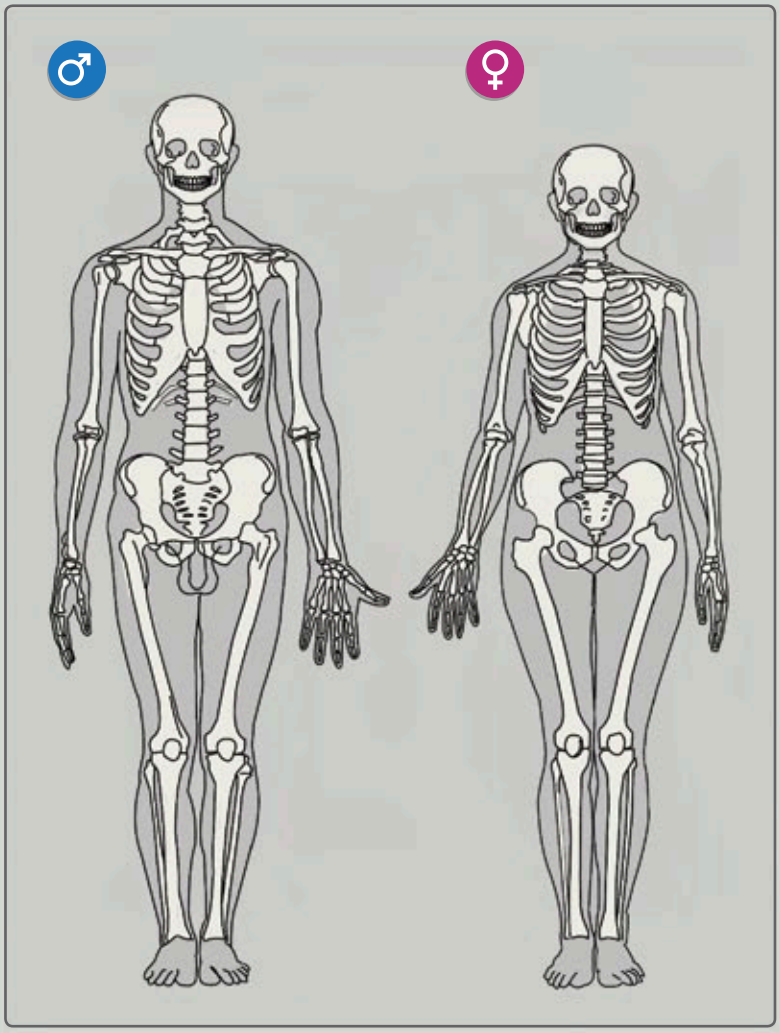
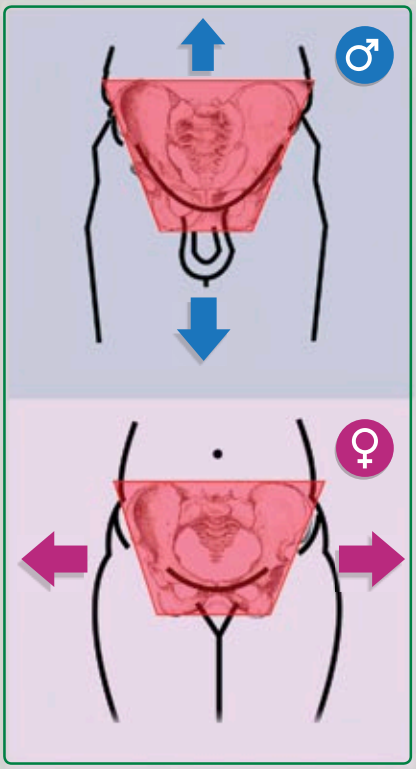
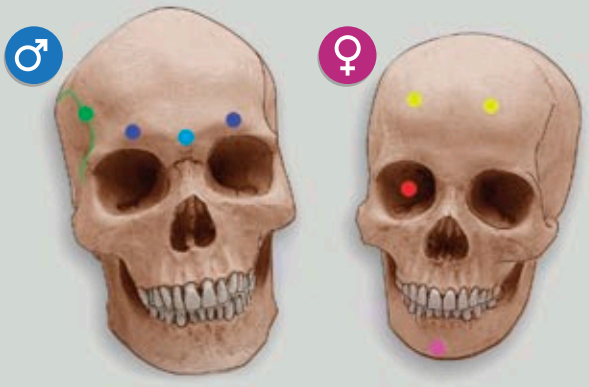
MAIN DIFFERENCES BETWEEN MALE AND FEMALE SKELETONS



PELVIS

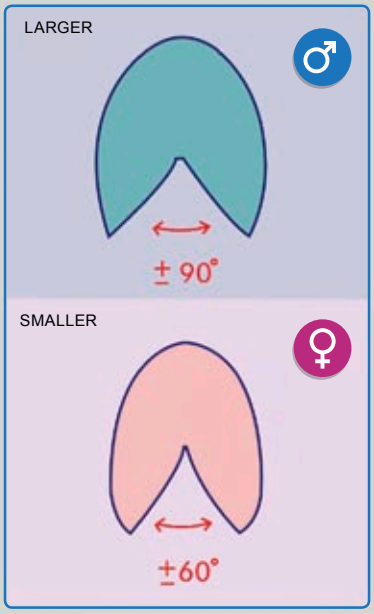


SKULL



FOREHEAD:	MALE SKULLS HAVE MORE PROMINENT **GLABELLA** AND **SUPRAORBITAL RIDGES**
TEMPLE:	MALE SKULLS HAVE MORE PROMINENT **TEMPORAL LINES**
EYE ORBITS:	FEMALE SKULLS HAVE ROUNDER **ORBITS**
JAWS:	FEMALE **JAWS** ARE NARROWER AND ROUNDER
FRONTAL:	FEMALE SKULLS HAVE LARGER **FRONTAL EMINENCES**

RIB CAGE



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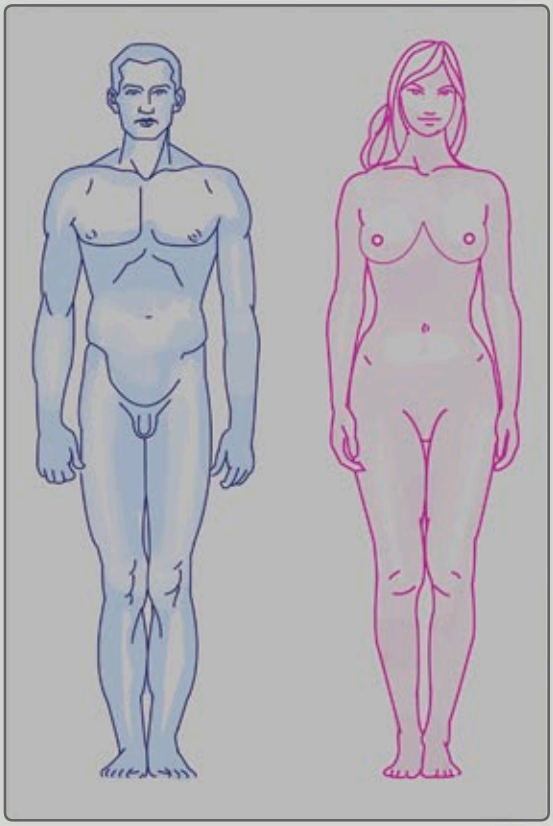
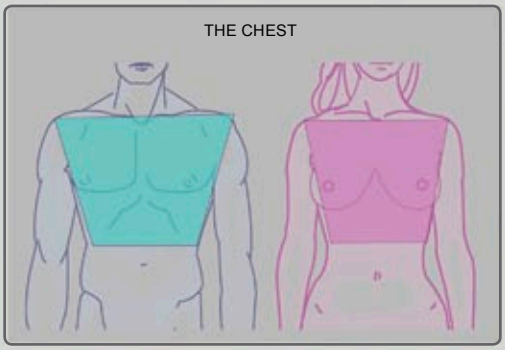
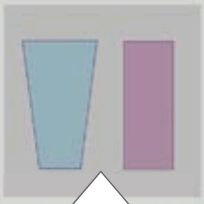
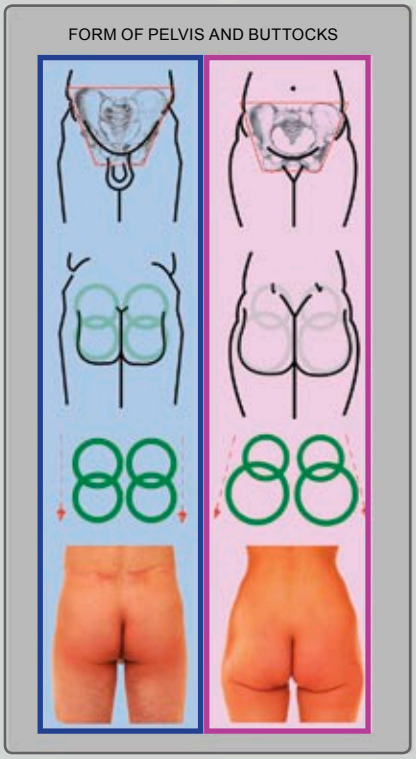
MOST IMPORTANT DIFFERENCES BETWEEN MALE AND FEMALE BODY SHAPES

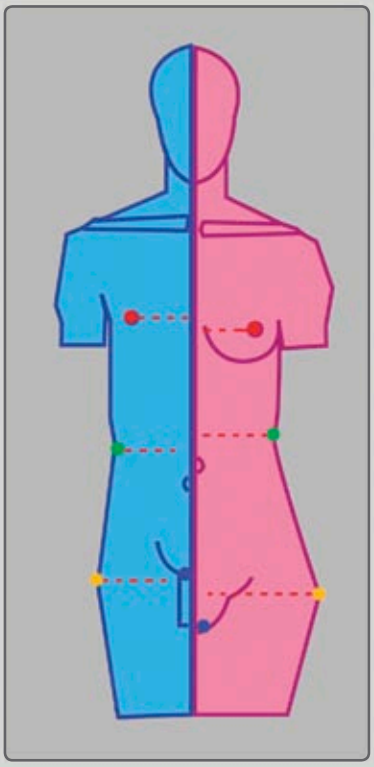






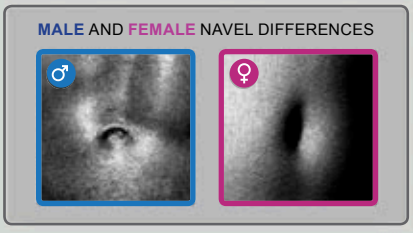
NOTE:
DIFFERENCE IN SILHOUETTE AT SHOULDERS AND HIPS.

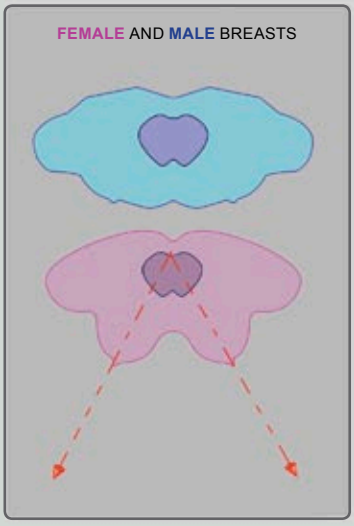




FEMALE FORMS ARE SOFTER AND CURVILINEAR.
MALE FORMS ARE MORE ANGULAR.

FEMALE HAS SLIGHTLY THICKER SUBCUTANEOUS FAT THAN **MALE**.





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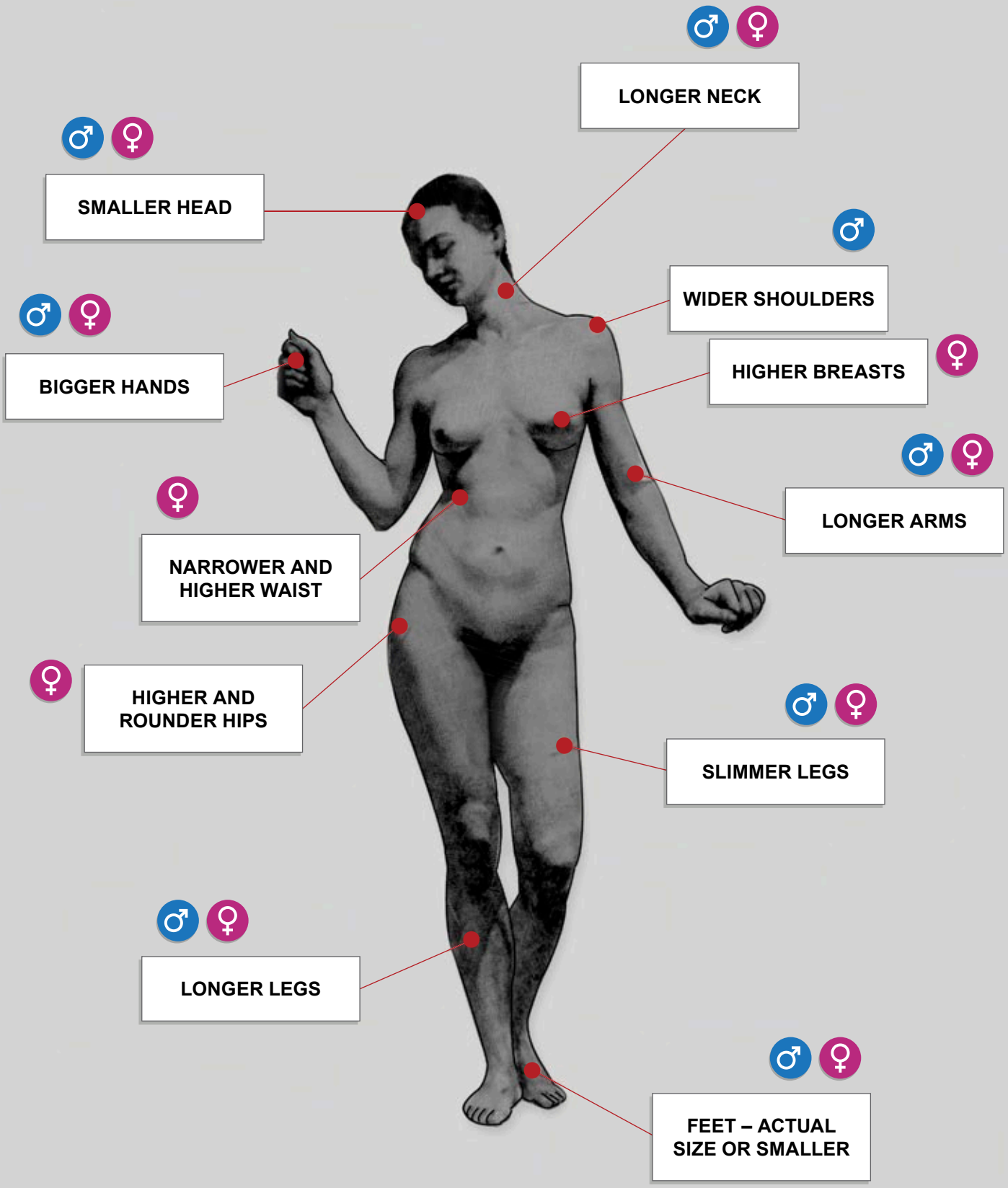
HOW TO MAKE A FIGURE MORE ATTRACTIVE



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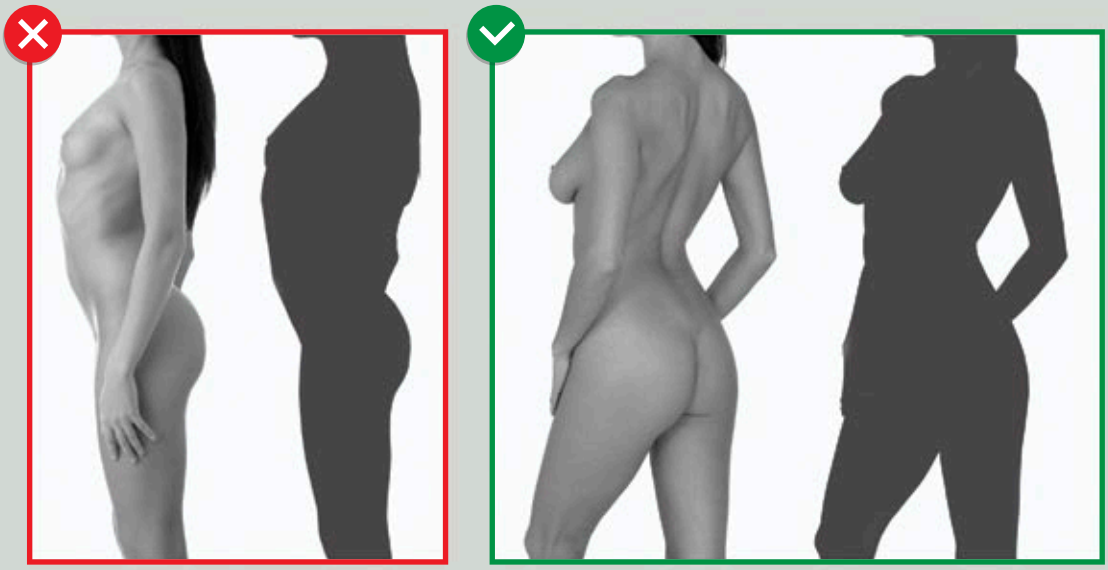
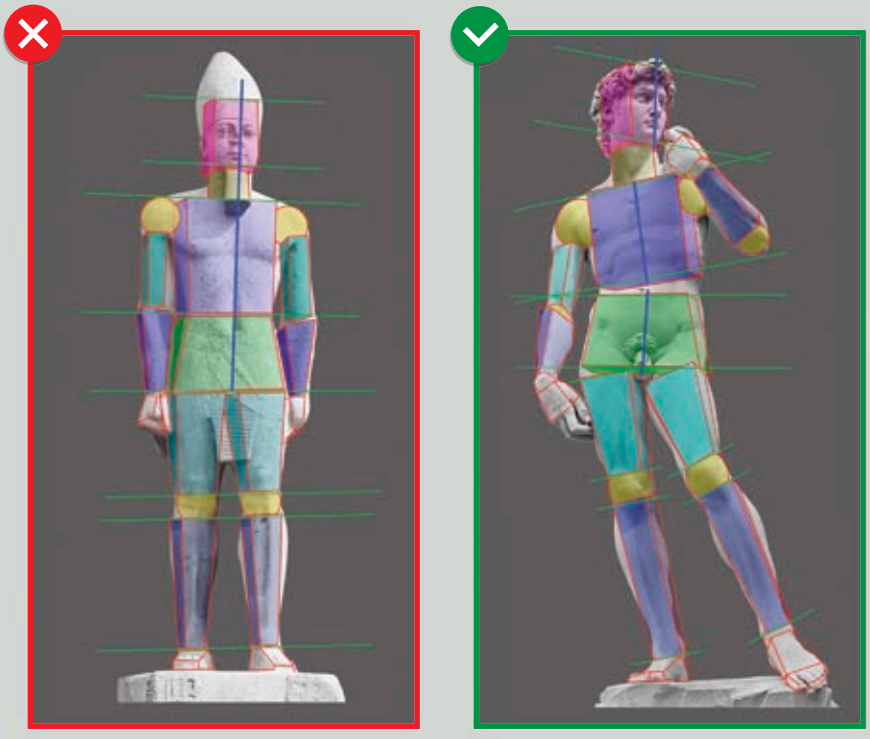
SILENT KILLER



THE MOST ESSENTIAL ELEMENTS IN FIGURE SCULPTURE NEED TO BE FAR ENOUGH FROM THE BODY. IF YOU CAN'T EASILY DISTINGUISH YOUR CHARACTER BY SILHOUETTE ALONE, THEN RECONSIDER THE COMPOSITION! AN UNCLEAR SILHOUETTE IS THE "SILENT KILLER" OF DESIGN!



ANOTHER KILLER IS **SYMMETRY**! SYMMETRICAL FIGURE SEEMS LIFELESS AND BORING.

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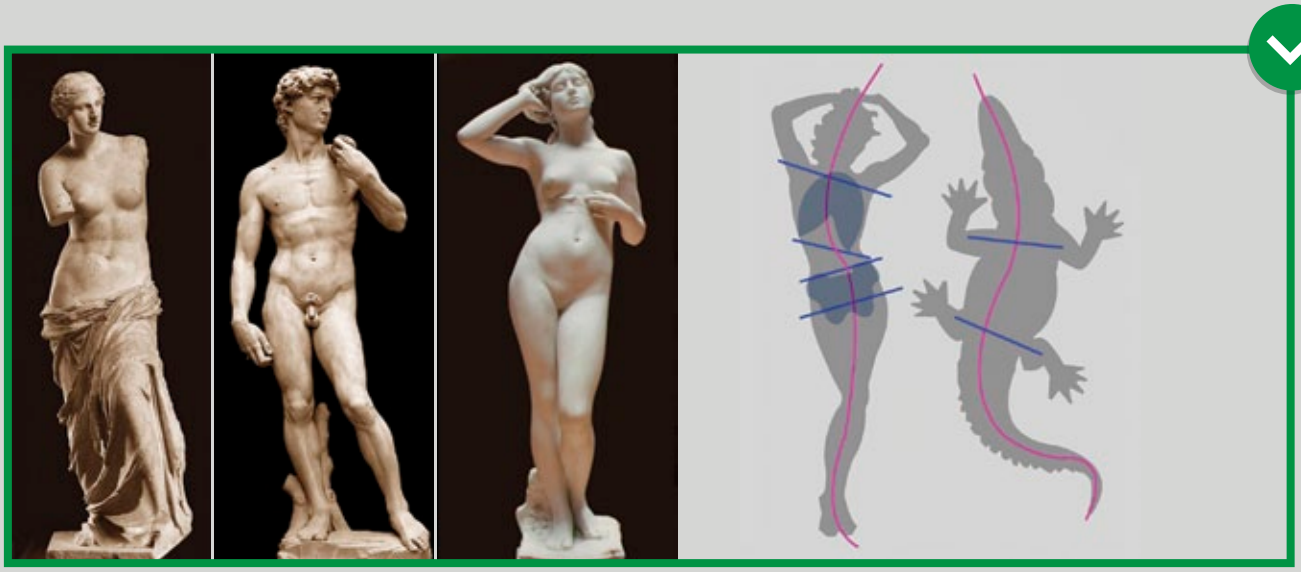
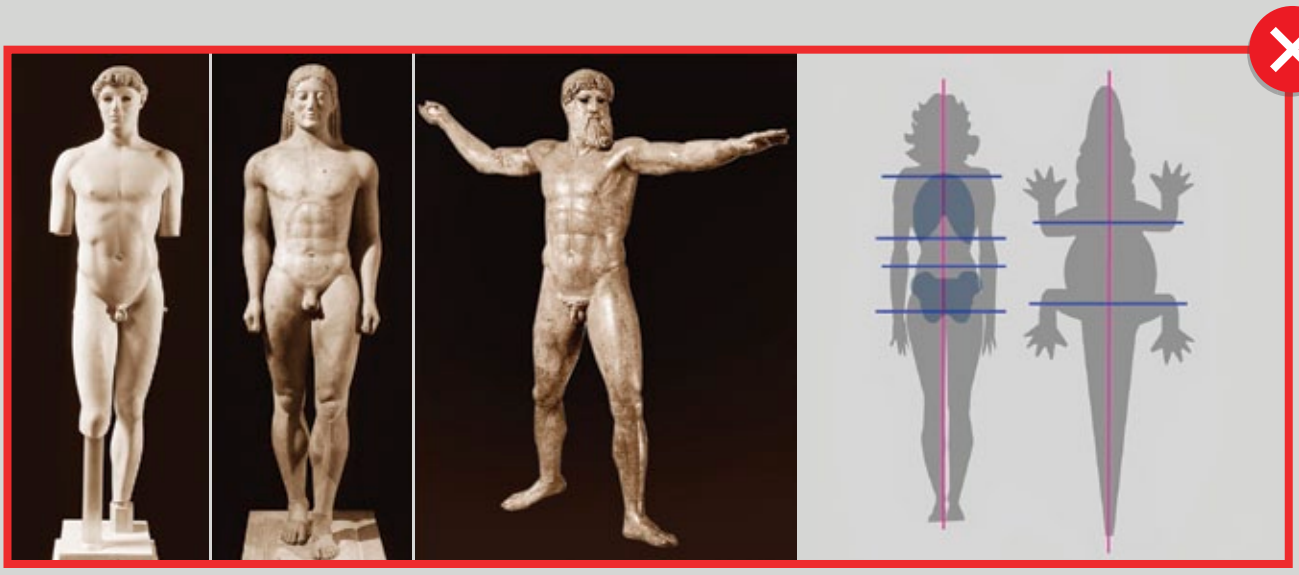
CONTRAPPOSTO

THIS TERM DESCRIBES THE POSITION OF A FIGURE IN WHICH THE HIPS AND LEGS ARE TURNED IN A DIFFERENT DIRECTION FROM THAT OF THE SHOULDERS AND HEAD; THE FIGURE TWISTS ON ITS OWN VERTICAL AXIS. THE FIGURE'S BODY AND POSTURE IS DEPICTED AS A SINUOUS OR SERPENTINE "**S**" SHAPE.





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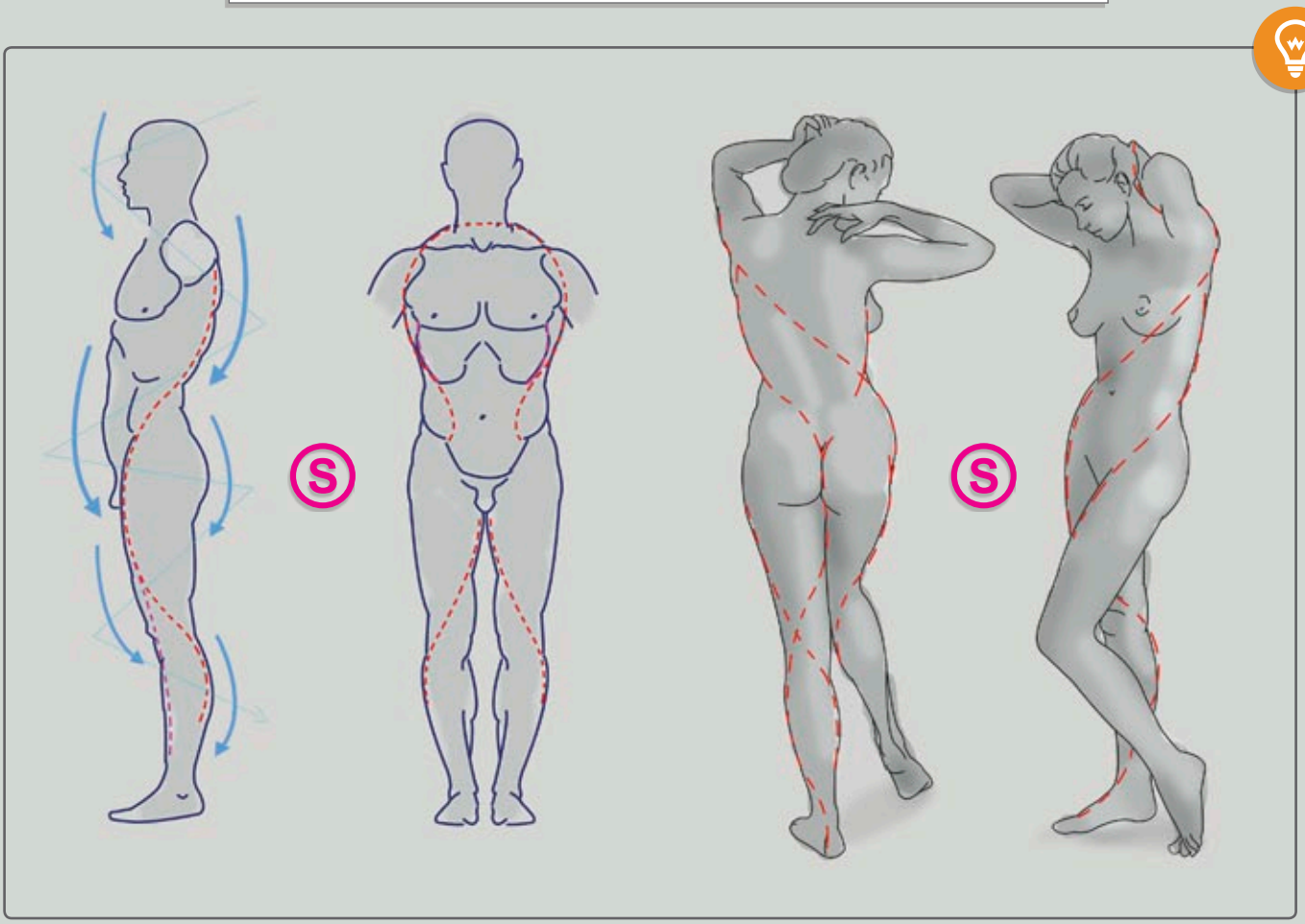
LAZY "S"

DRAW IMAGINARY S-SHAPED LINES AND BY FOLLOWING THEM, YOU CAN EASILY CONSTRUCT THE CURVES OF THE BODY.



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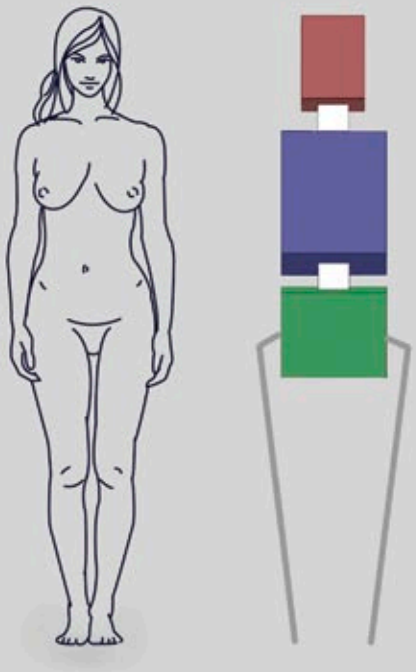
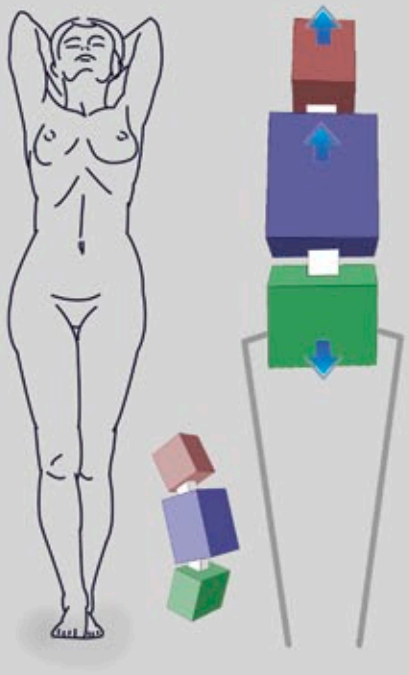
5 POSITION COMBINATIONS OF MOVABLE MASSES

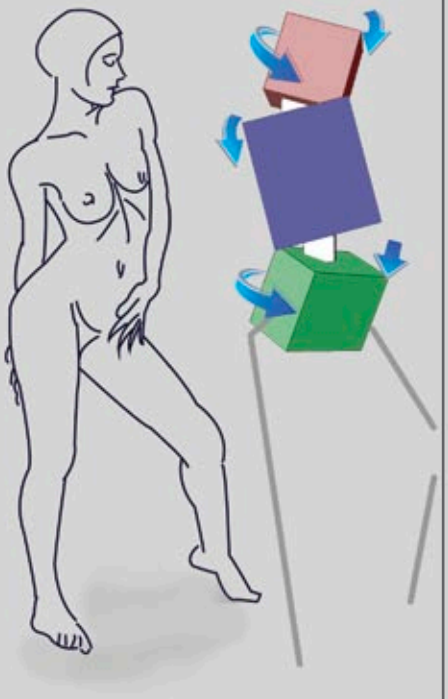
ERECT



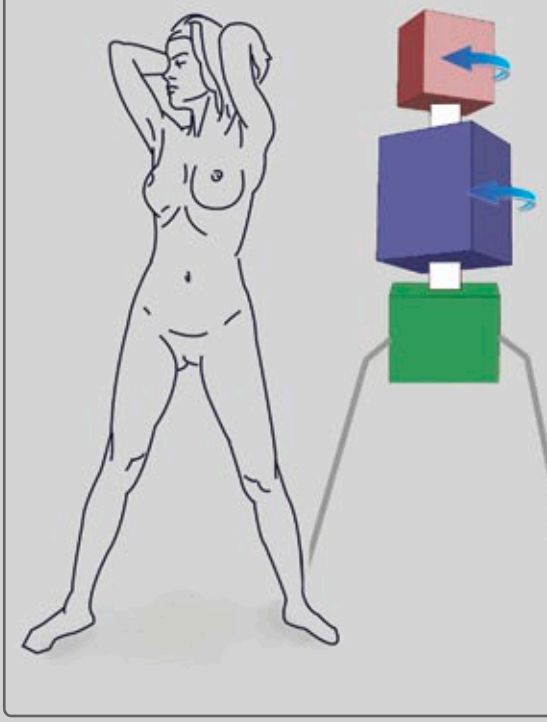
TIPPED BACK



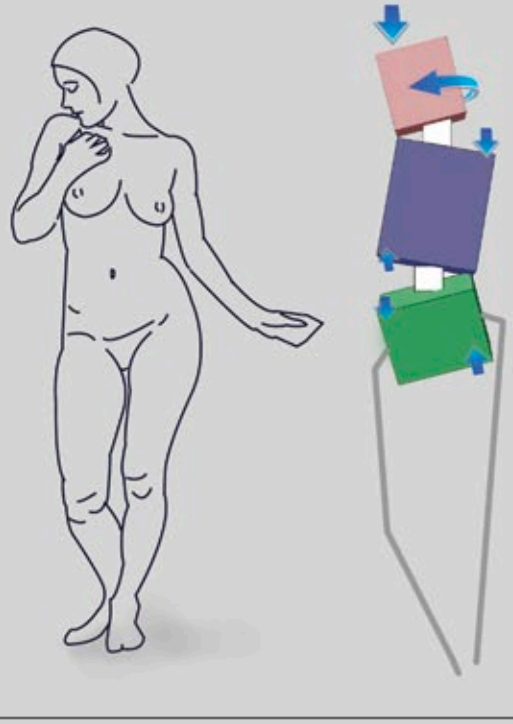
COMBINATION



ROTATED



TILTED



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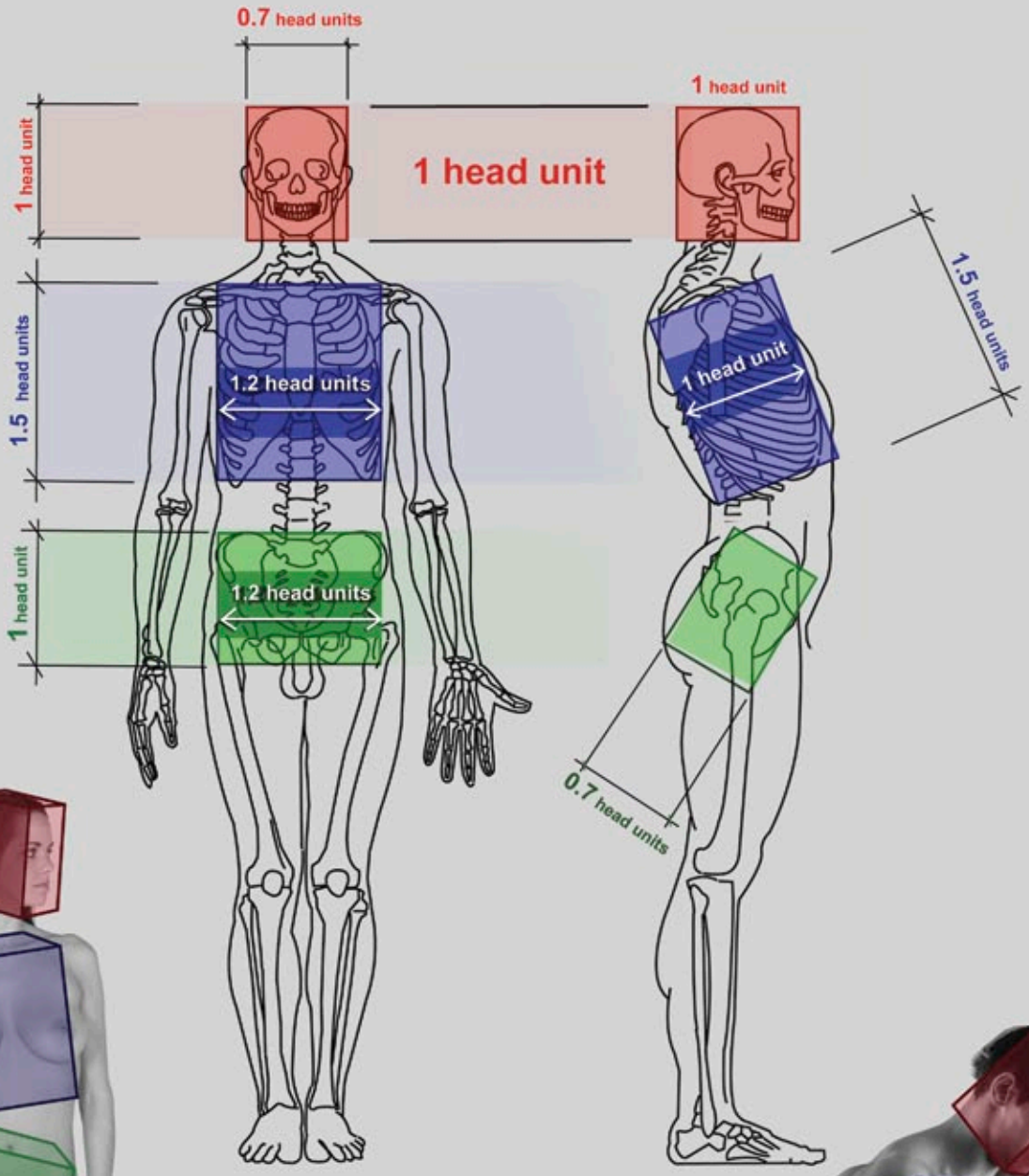
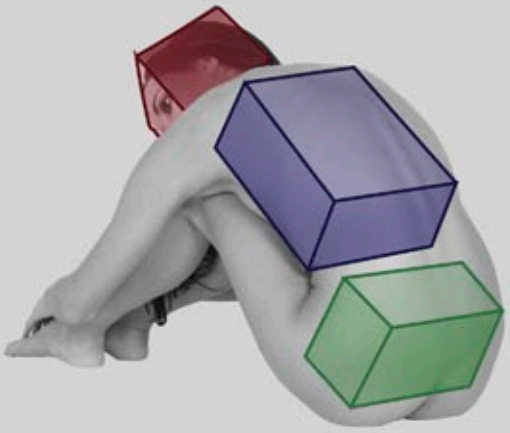
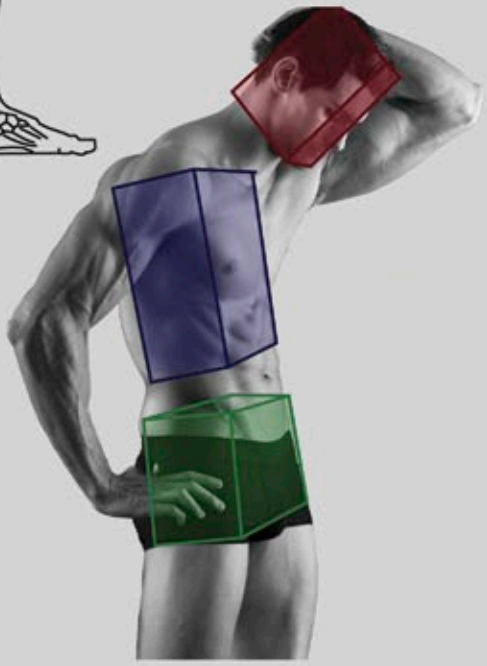
PROPORTIONS IN HEAD UNITS OF MOVABLE MASSES







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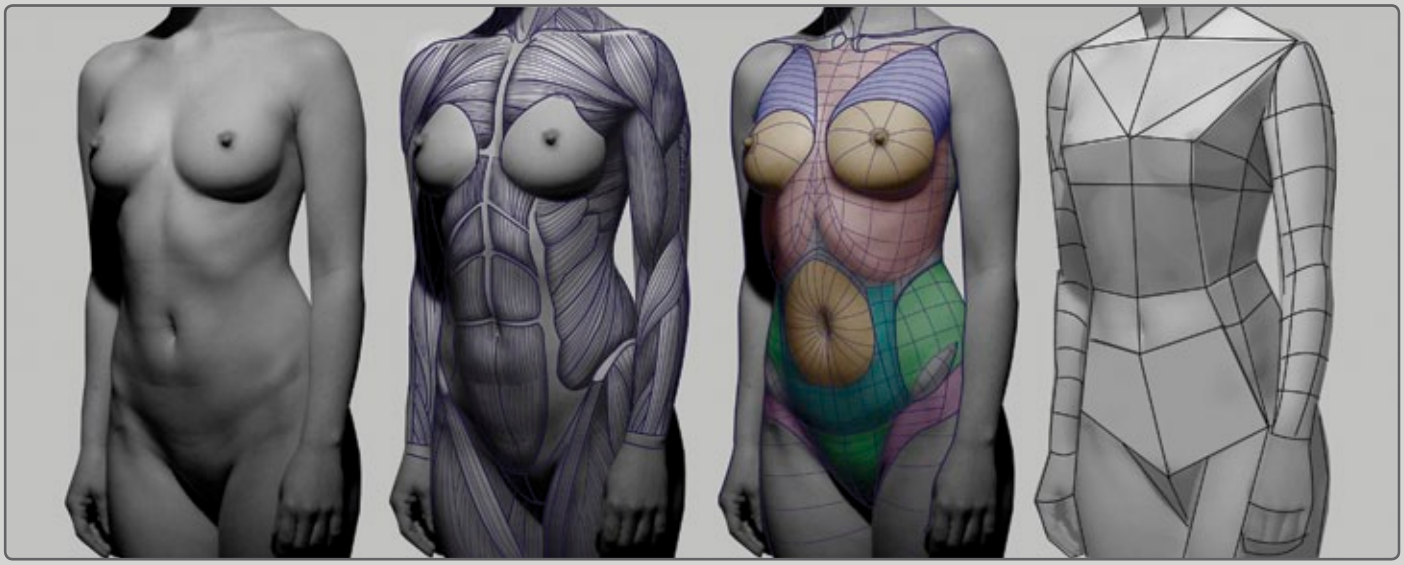
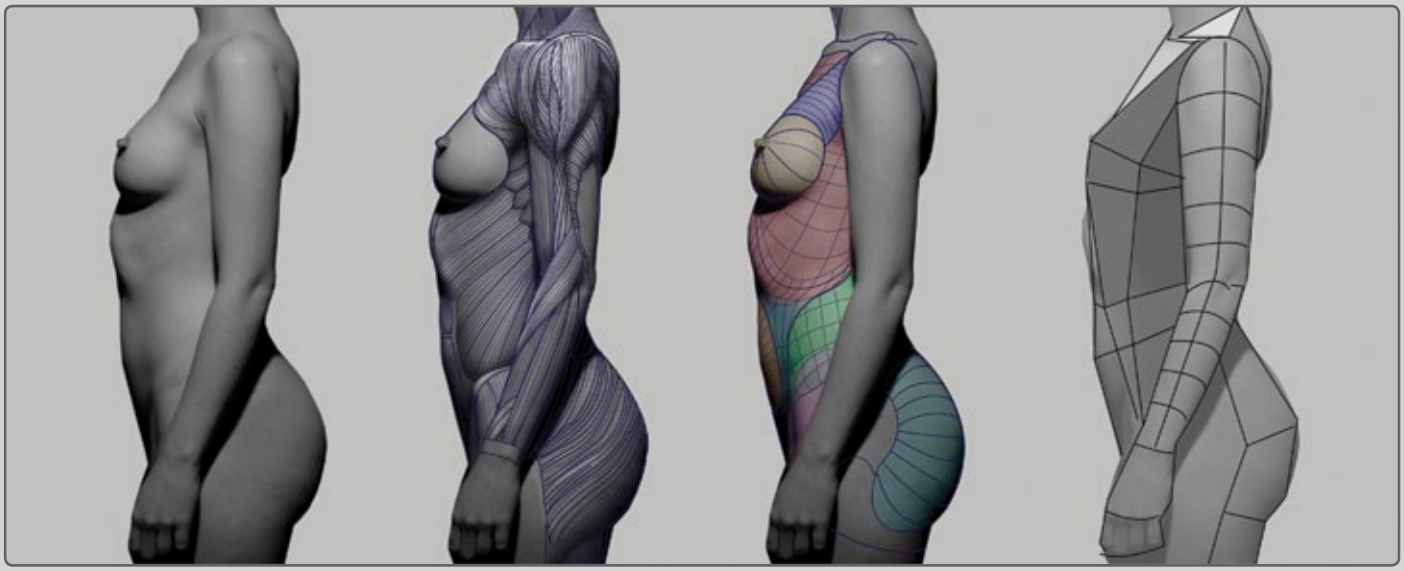
FEMALE TORSO FROM REALISTIC TO SIMPLIFIED



REAL MUSCLES SHAPES BLOCK-OUT



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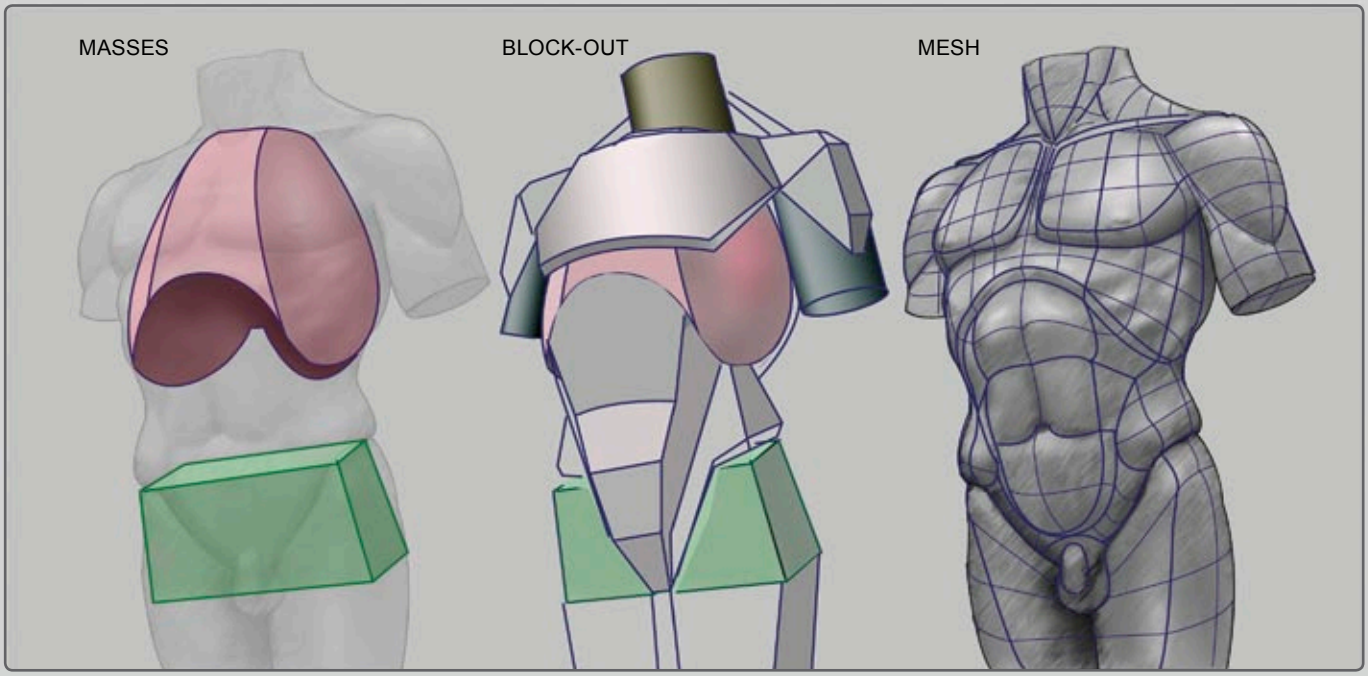
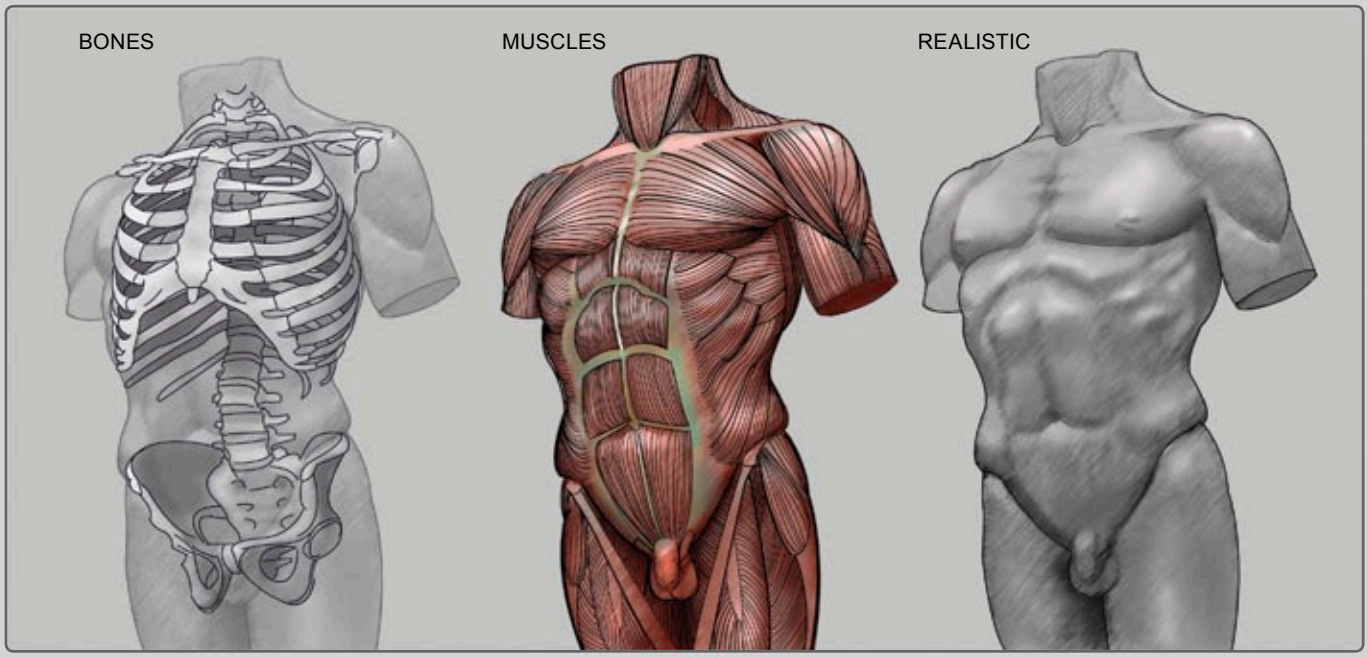
MALE TORSO FROM REALISTIC TO SIMPLIFIED





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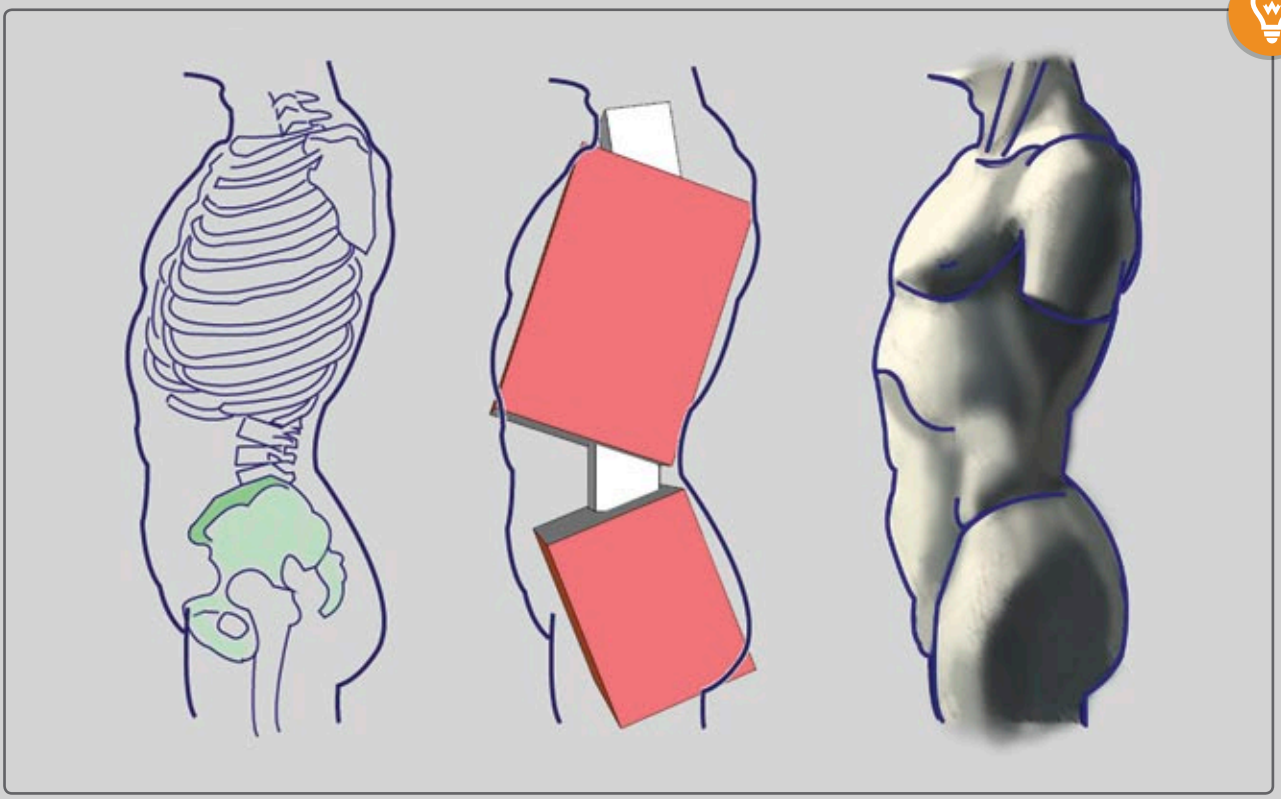
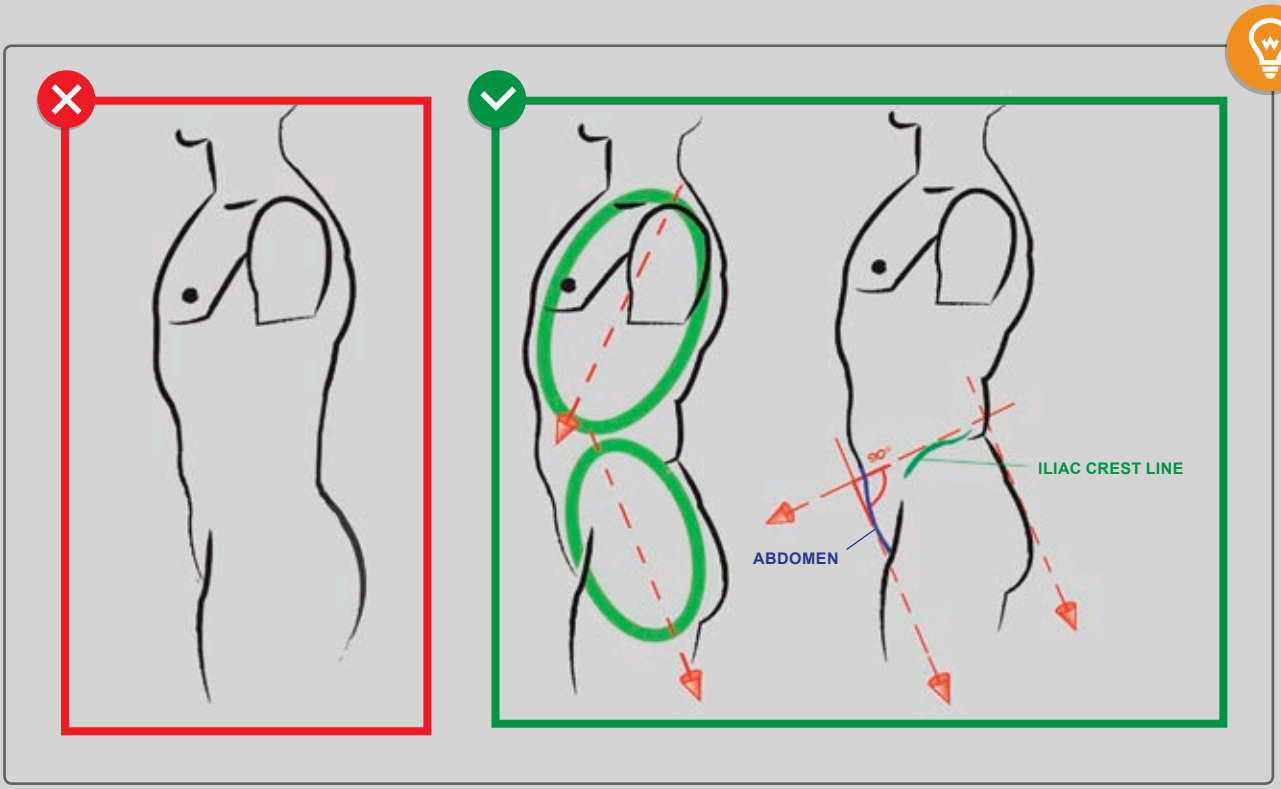
ANGULAR RELATIONSHIP OF MOVABLE MASSES OF TORSO





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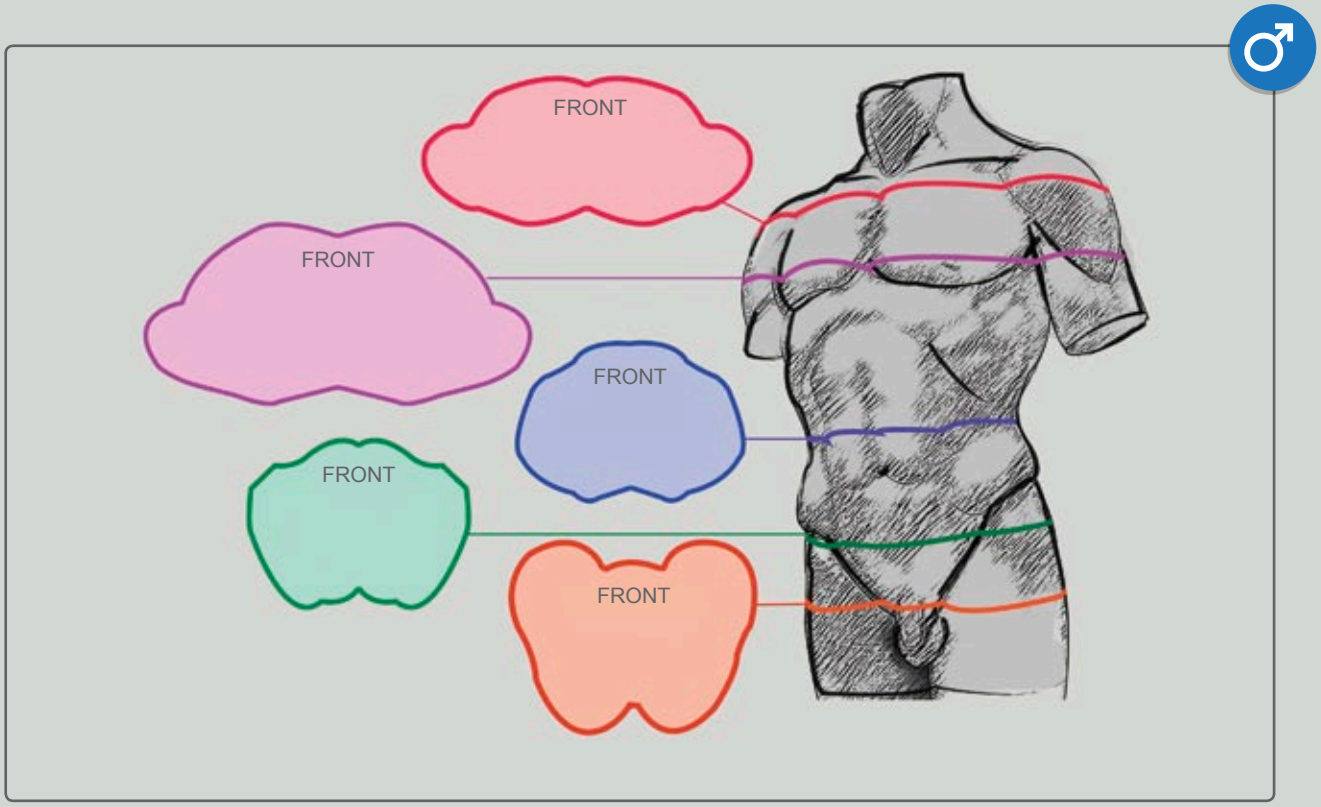
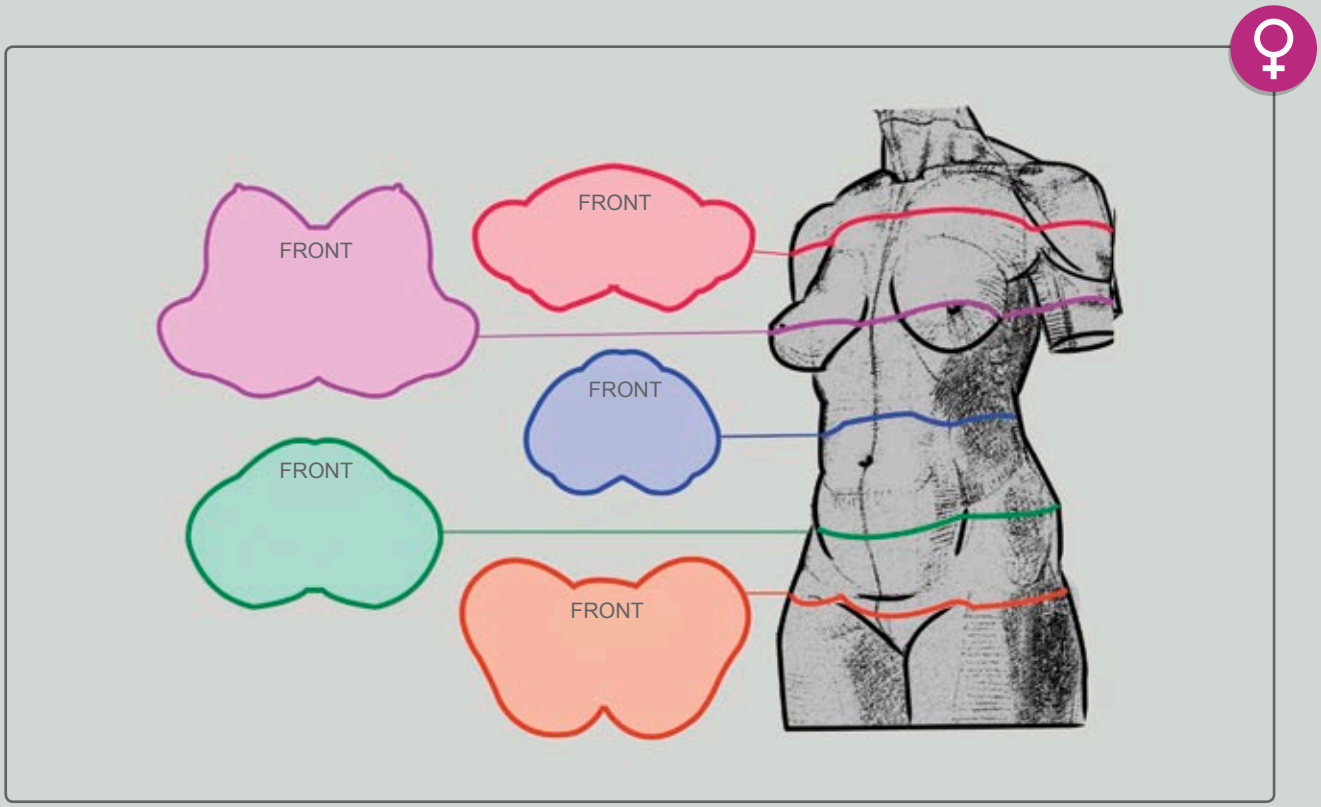
HORIZONTAL CROSS SECTIONS OF TORSO





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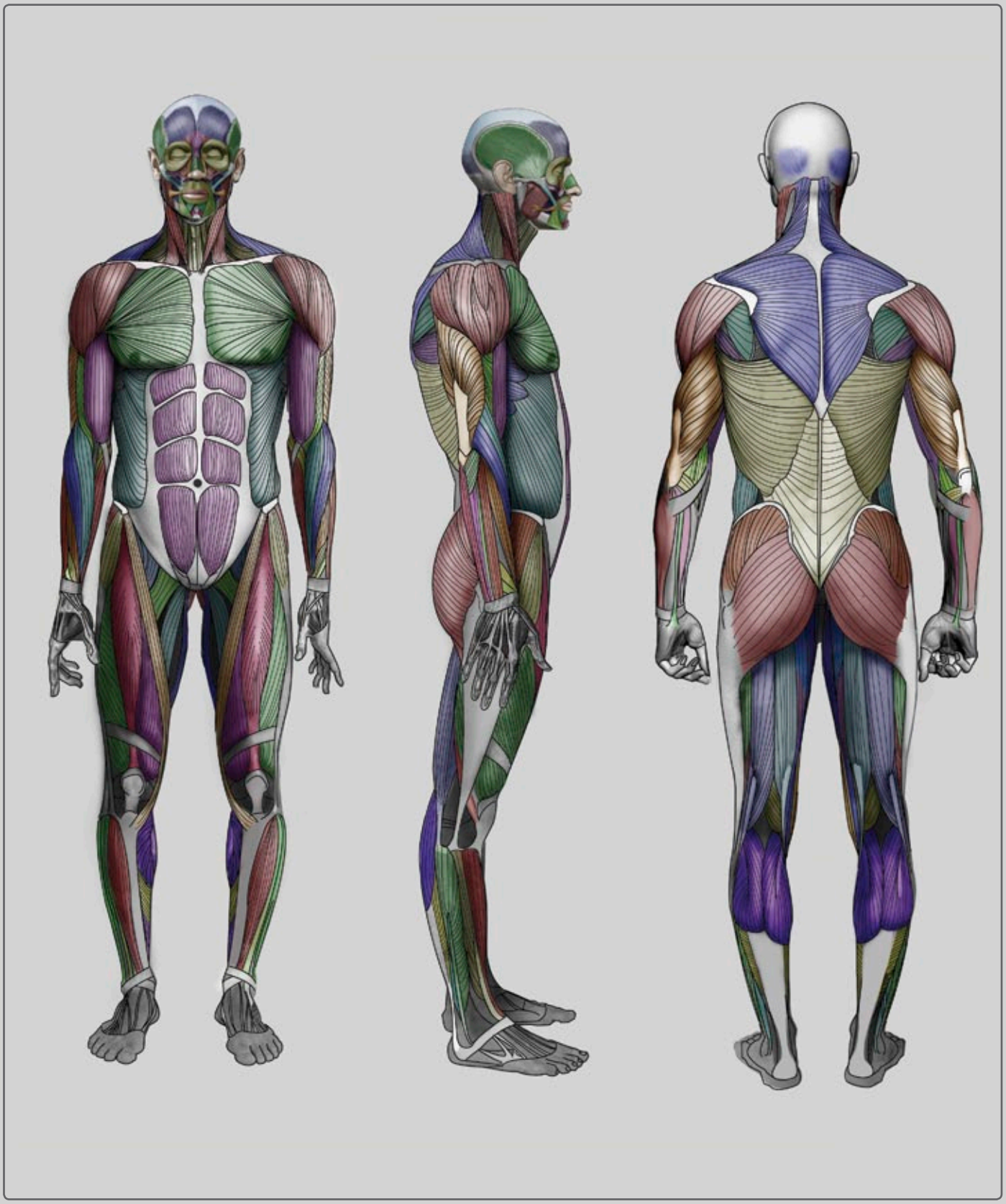
ÉCORCHÉ



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MALE FIGURE

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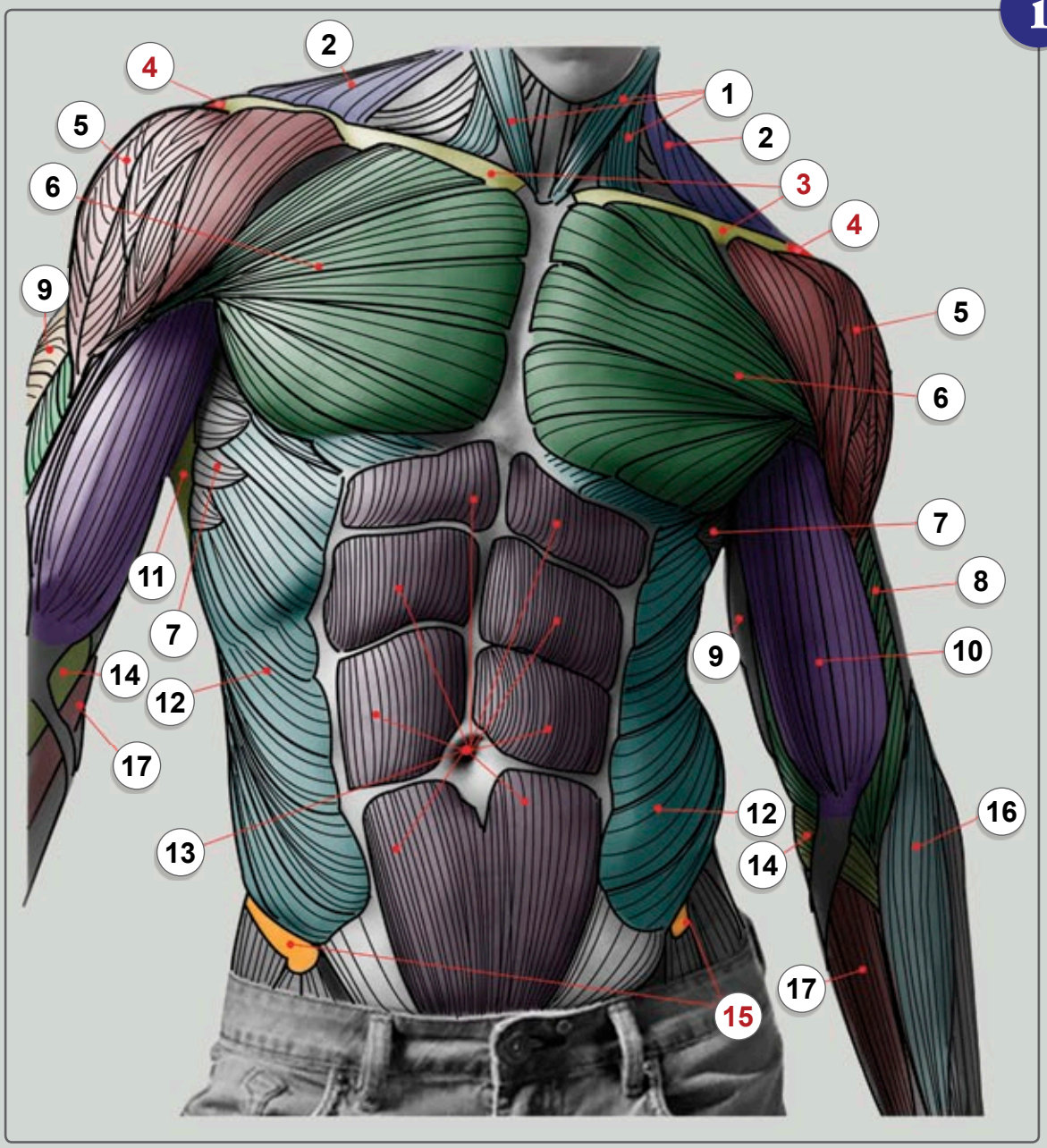
MAIN MUSCLES AND LANDMARK POINTS OF FRONTAL TORSO



1	STERNOCLEIDOMASTOID	7	SERRATUS ANTERIOR	13	RECTUS ABDOMINIS
2	TRAPEZIUS	8	BRACHIALIS	14	PRONATOR TERES
3	CLAVICLE	9	TRICEPS BRACHII	15	ANTERIOR SUPERIOR ILIAC SPINE
4	SHOULDER BLADE	10	BICEPS BRACHII	16	BRACHIORADIALIS
5	DELTOID	11	LATISSIMUS DORSI	17	FLEXOR CARPI RADIALIS
6	PECTORALIS	12	EXTERNAL OBLIQUE		

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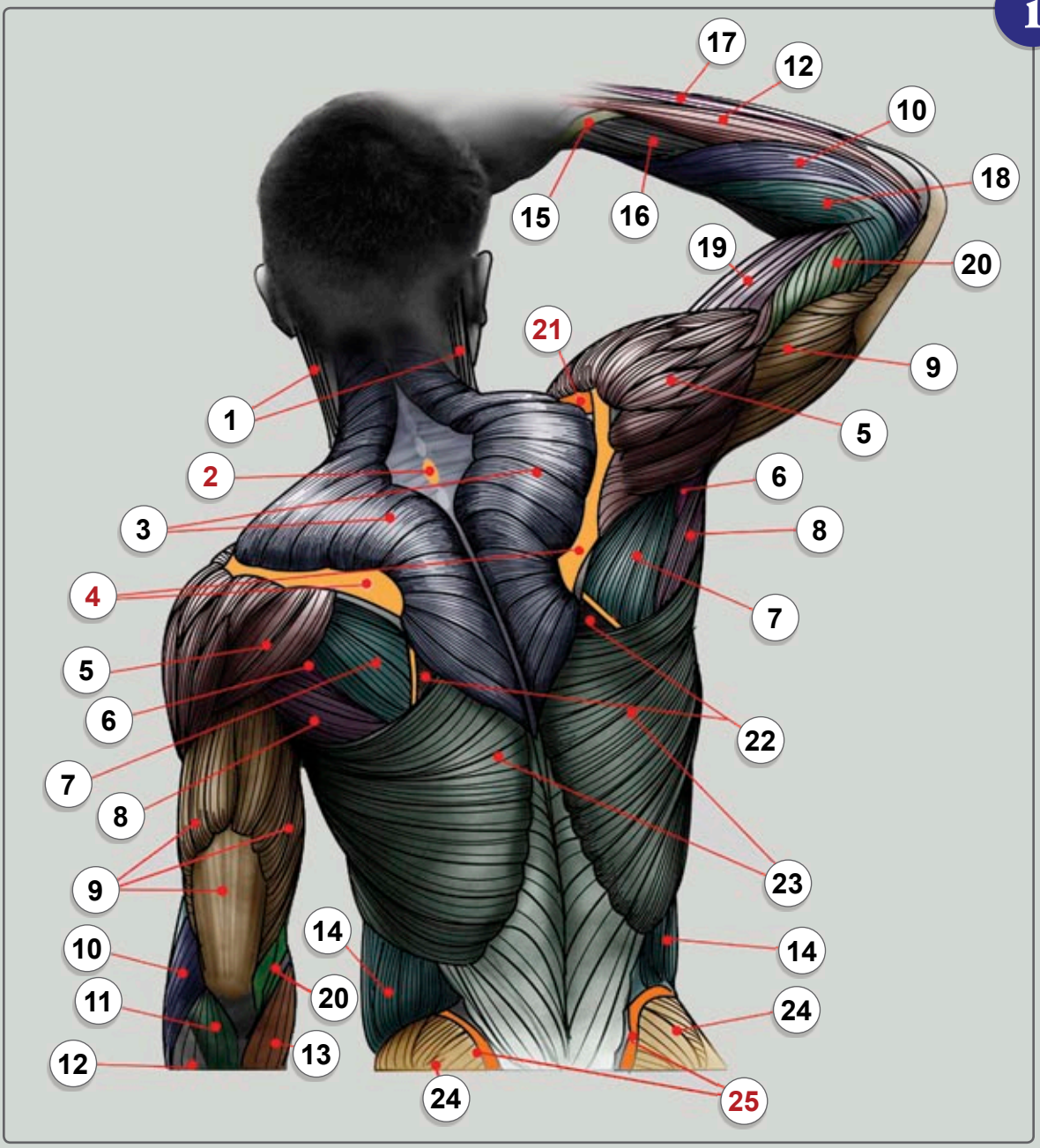
MAIN MUSCLES AND BONES OF THE BACK



1	STERNOCLEIDOMASTOID	10	EXTENSOR CARPI RADIALIS LONGUS	19	BICEPS BRACHII
2	7TH VERTEBRAE	11	ANCONEUS	20	BRACHIALIS
3	TRAPEZIUS	12	EXTENSOR DIGITORUM	21	CLAVICLE
4	SPINE OF SCAPULA	13	FLEXOR CARPI ULNARIS	22	RHOMBOID MAJOR
5	DELTOID	14	EXTERNAL OBLIQUE	23	LATISSIMUS DORSI
6	TERES MINOR	15	ABDUCTOR POLLICIS LONGUS	24	GLUTEUS MAXIMUS
7	INFRASPINATUS	16	EXTENSOR CARPI RADIALIS BREVIS	25	POSTERIOR SUPERIOR ILIAC SPINE
8	TERES MAJOR	17	EXTENSOR CARPI ULNARIS		
9	TRICEPS BRACHII	18	BRACHIORADIALIS		

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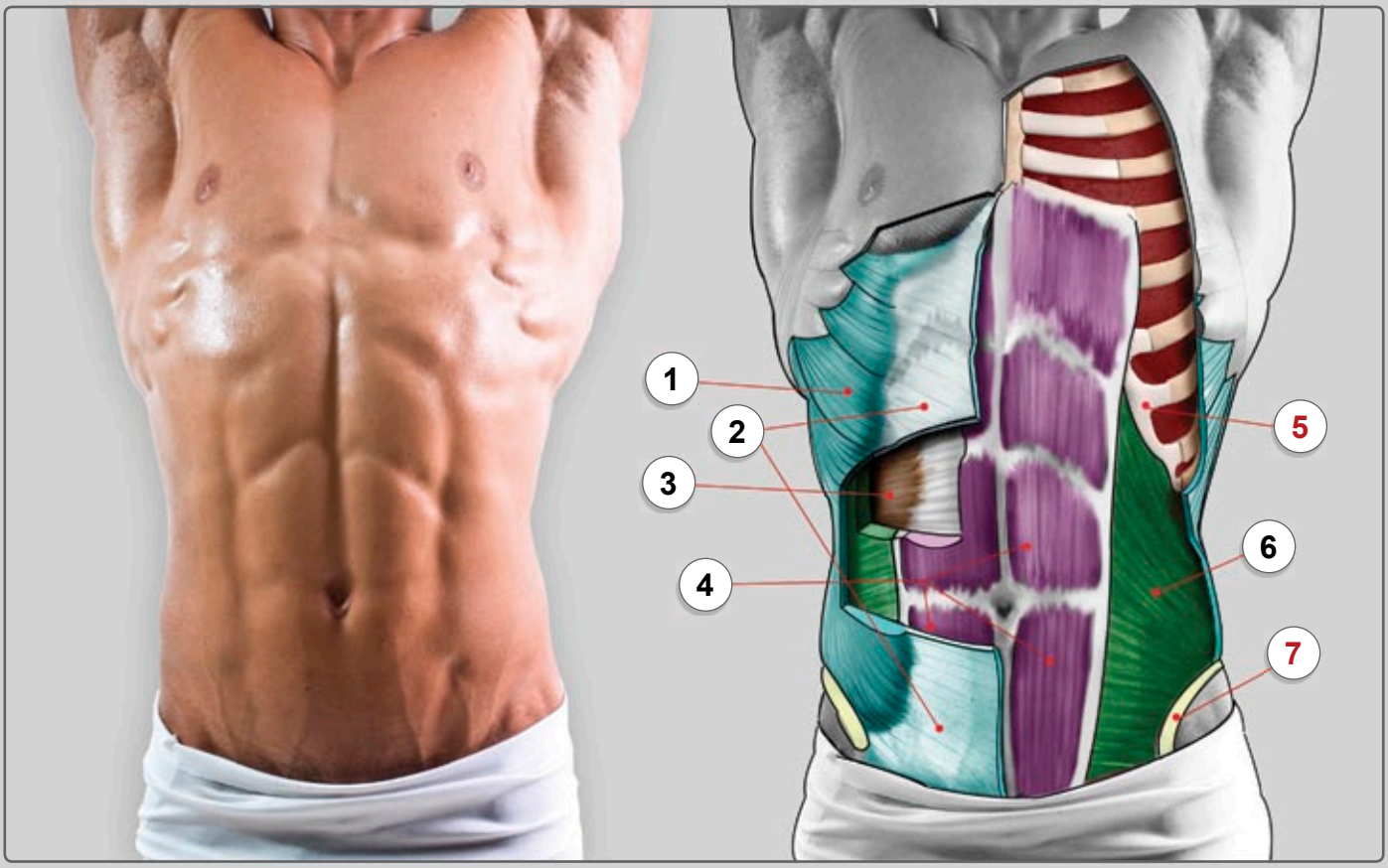
ABDOMINAL MUSCLES



1	**EXTERNAL OBLIQUE**: LOCATED ON SIDE AND FRONT OF ABDOMEN
2	**APONEUROSIS** OF **EXTERNAL OBLIQUE**: BROAD, FLAT, TENDINOUS PORTION OF **EXTERNAL OBLIQUE** MUSCLE
3	**TRANSVERSUS ABDOMINIS**: LOCATED UNDER **OBLIQUES**, IT IS THE DEEPEST OF ABDOMINAL MUSCLES AND WRAPS AROUND SPINE FOR PROTECTION AND STABILITY
4	**RECTUS ABDOMINIS**: ALSO KNOWN AS **"ABS"** OR **SIX-PACK** – LOCATED ALONG FRONT OF THE ABDOMEN. THIS IS THE MOST WELL-KNOWN ABDOMINAL MUSCLE
5	**RIB CAGE** (THORACIC CAGE OR THORAX)
6	**INTERNAL ABDOMINAL OBLIQUE**: LOCATED UNDER **EXTERNAL OBLIQUES** AND RUNS IN THE OPPOSITE DIRECTION
7	**WING OF ILIUM** – COMMONLY CALLED **"HIP BONE"** (ILIAC CREST)

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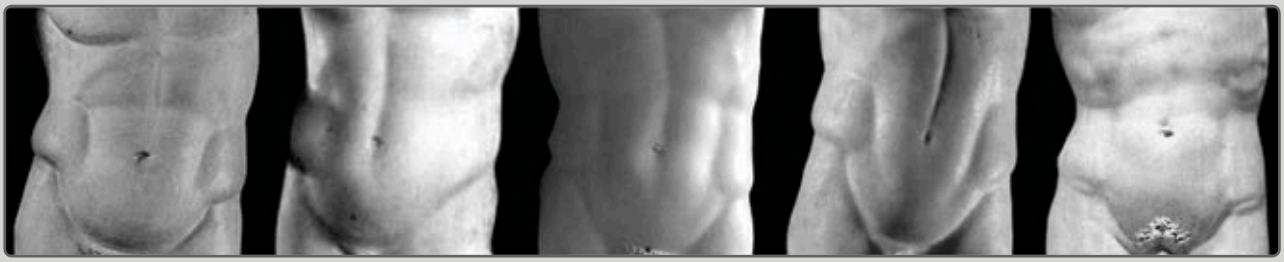
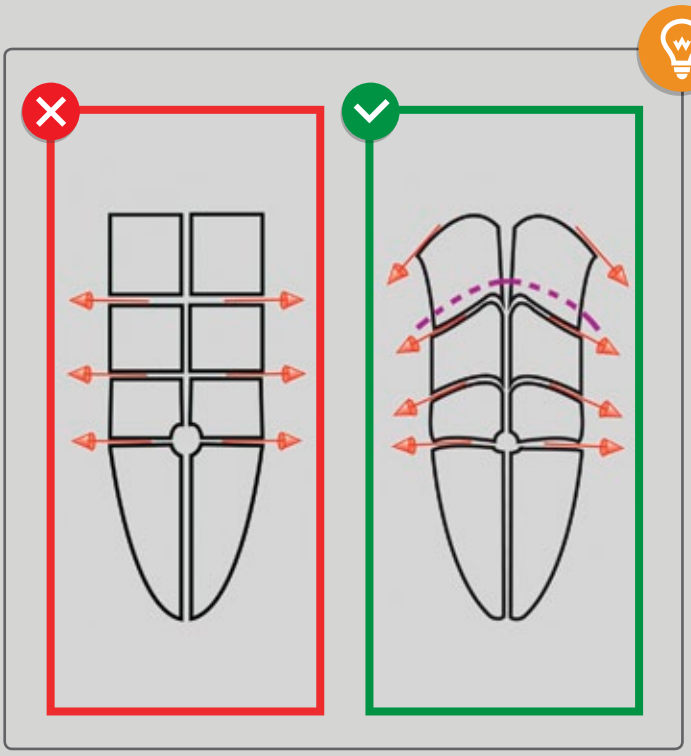
IS A “SIX-PACK” REALLY AN “EIGHT-PACK”?

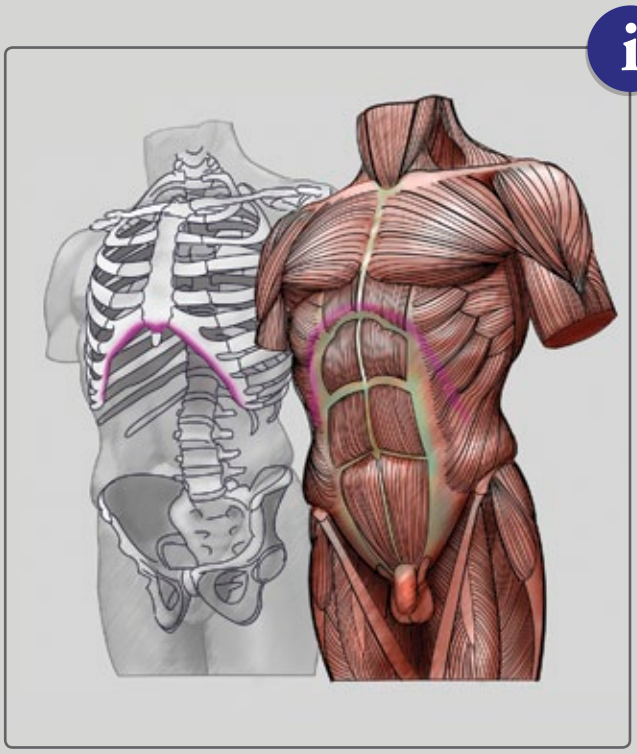


CLASSIC SCULPTURE

FITNESS

SKINLESS





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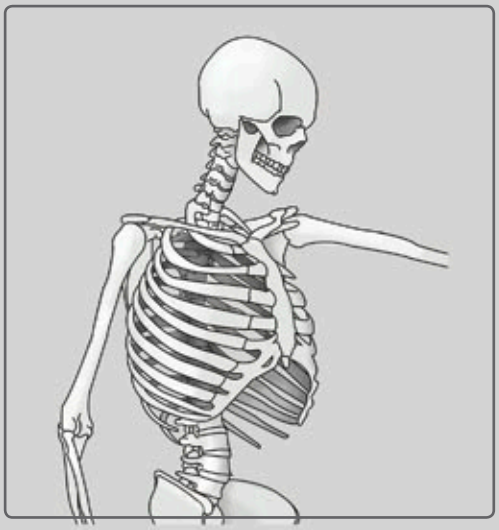
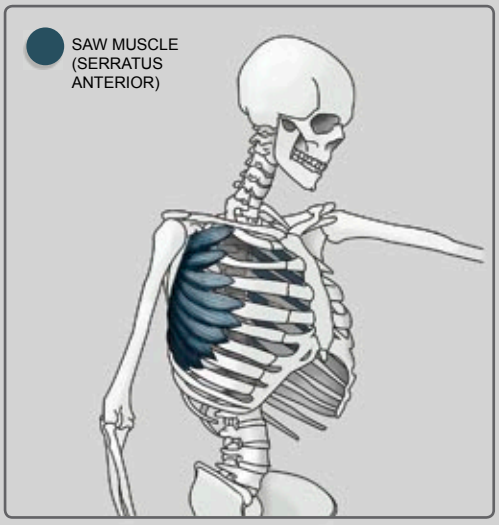
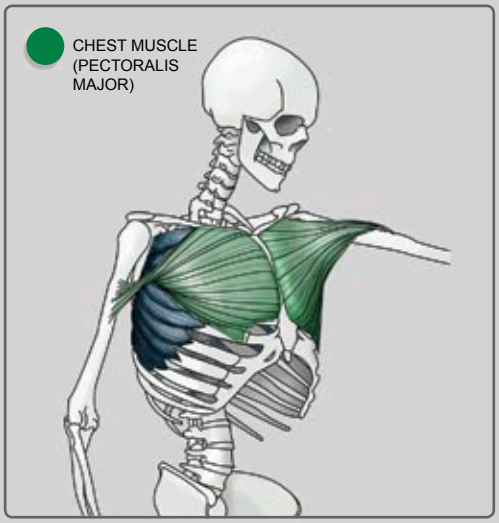
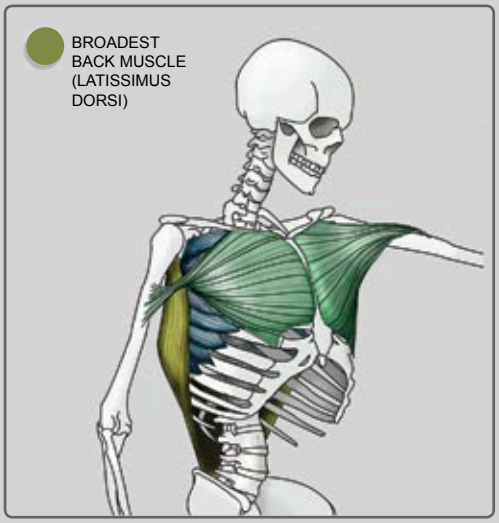
MOST IMPORTANT MUSCLES OF FRONTAL TORSO

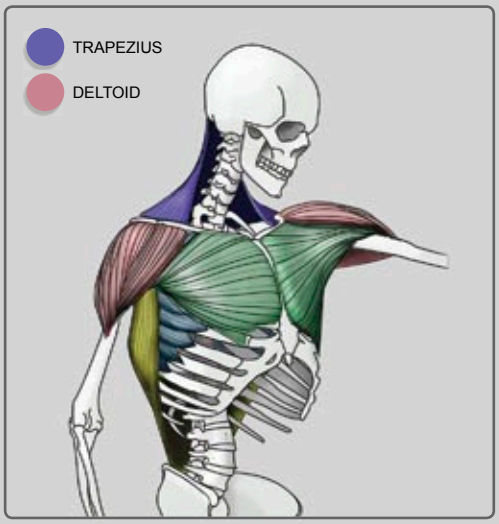
(LAYER BY LAYER)

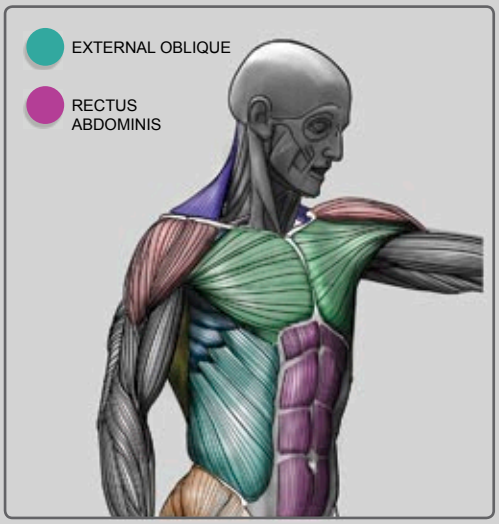












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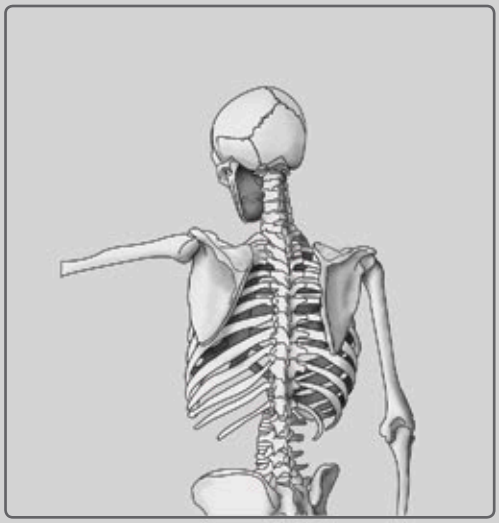
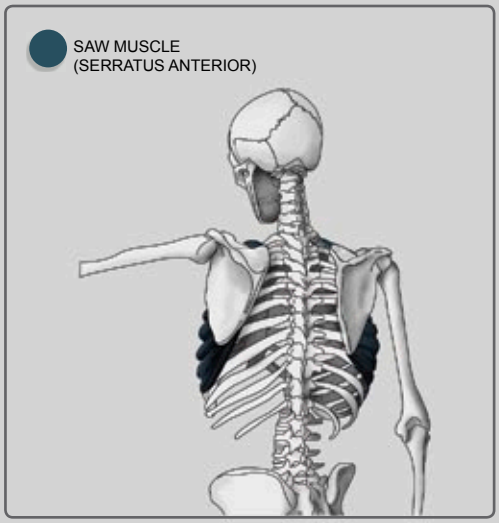
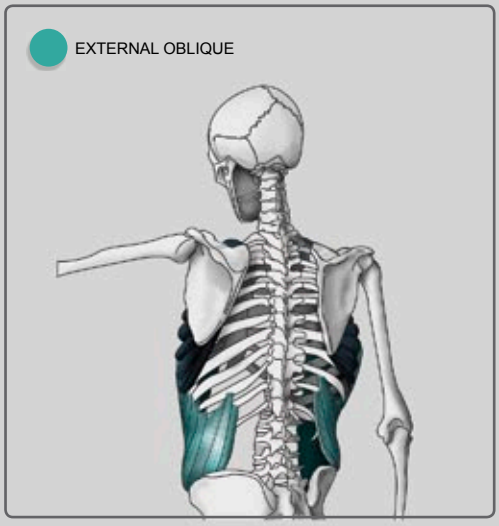
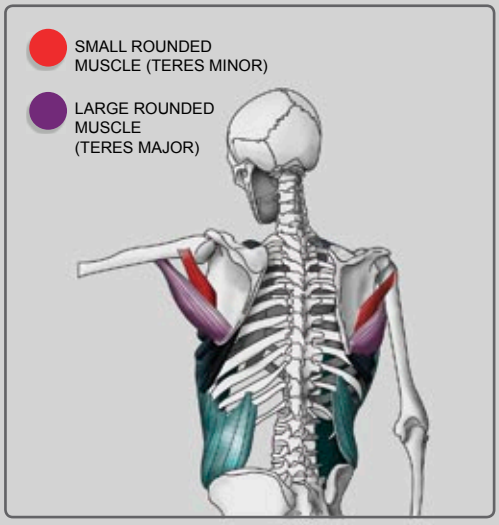
MOST IMPORTANT BACK MUSCLES

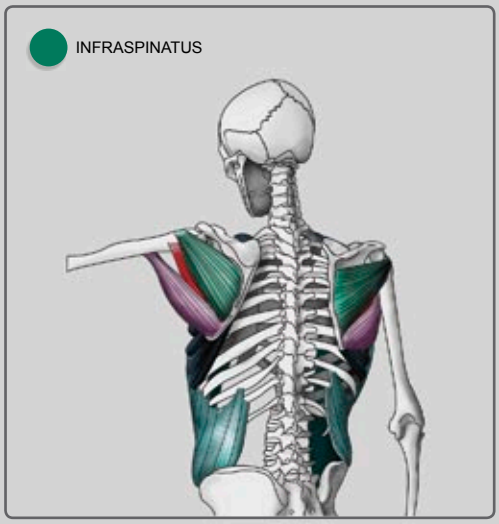
(LAYER BY LAYER)

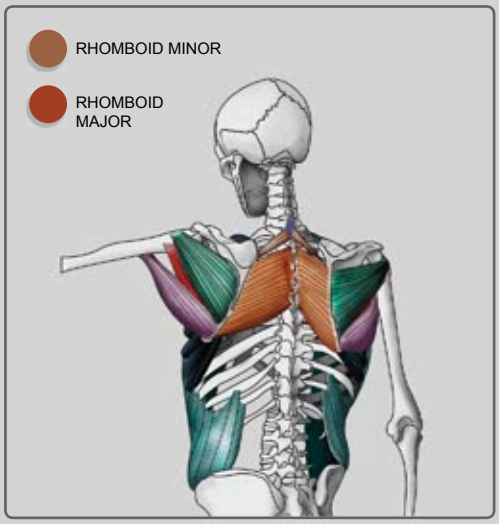












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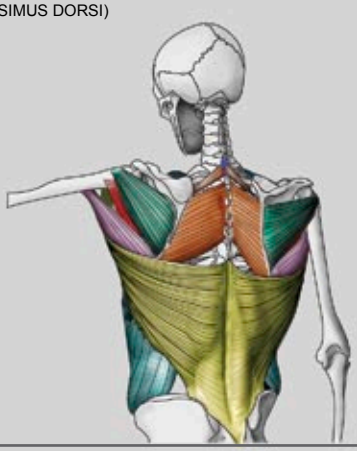
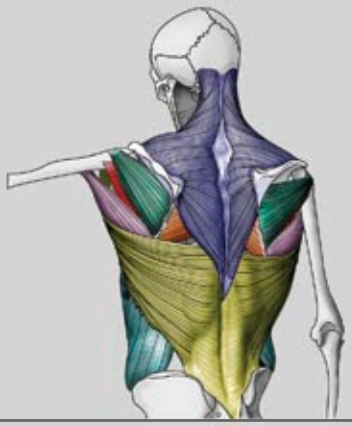
MOST IMPORTANT BACK MUSCLES

(LAYER BY LAYER)

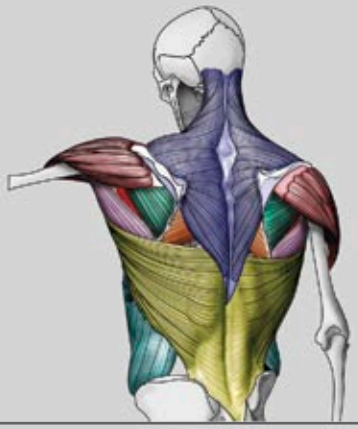
BROADEST
BACK MUSCLE
(LATISSIMUS DORSI)



TRAPEZIUS

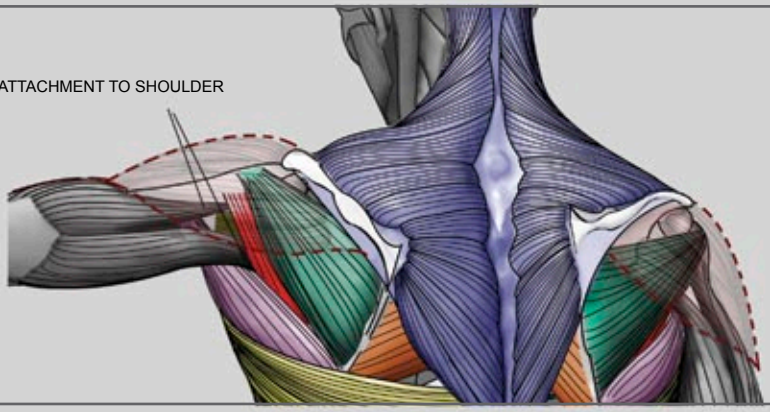


DELTOID



BUTTOCKS
(GLUTEUS MAXIMUS)

TRICEPS ATTACHMENT TO SHOULDER



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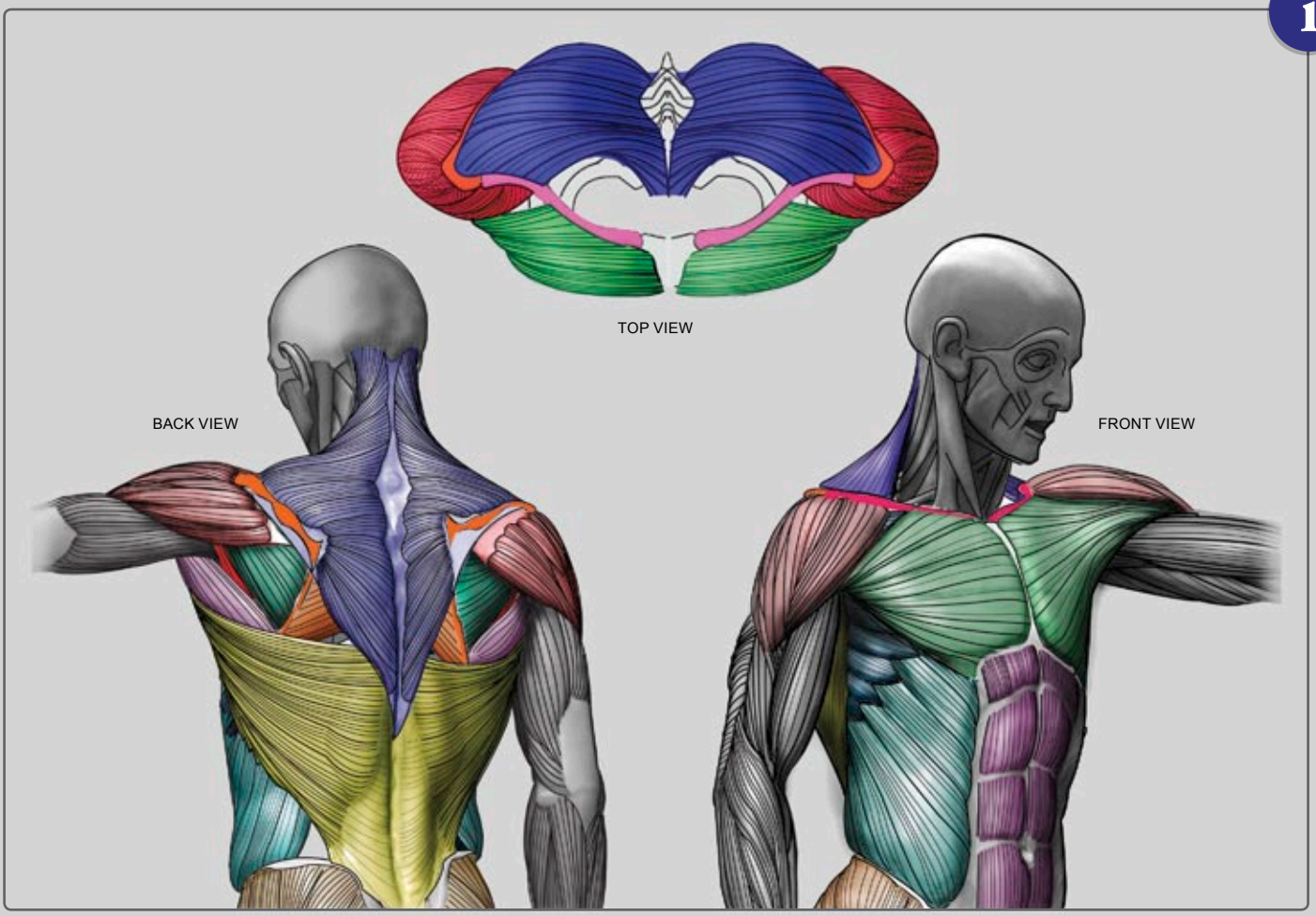
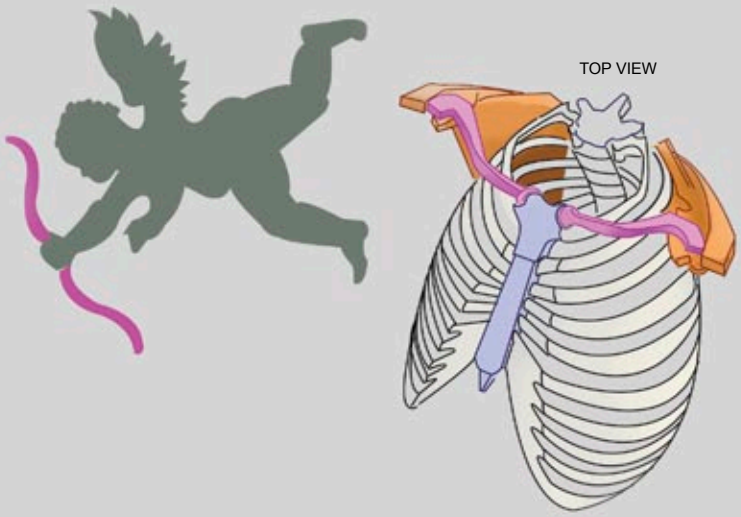
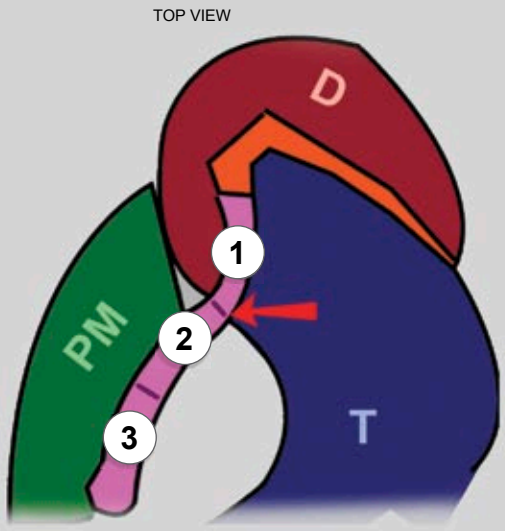
CLAVICLE – SHAPE AND CONNECTIONS



IF YOU LOOK AT THE CLAVICLE FROM ABOVE, YOU CAN SEE IT'S AN "S" SHAPE.



BOTH, (D) AND (T) CONNECT ON THE LATERAL THIRD OF THE CLAVICLE.



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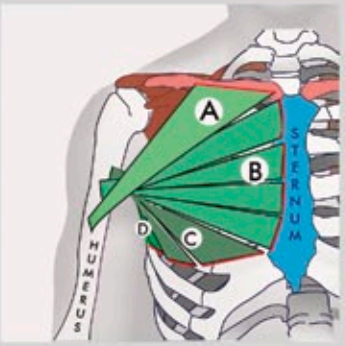
GREAT CHEST MUSCLE

(PECTORALIS MAJOR)

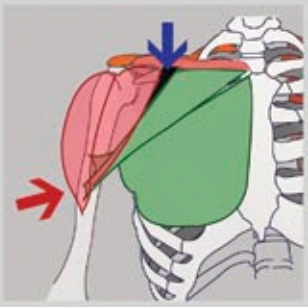


ONE END OF **PM** IS CONNECTED TO THE HUMERUS AND OTHER END CONNECTS:

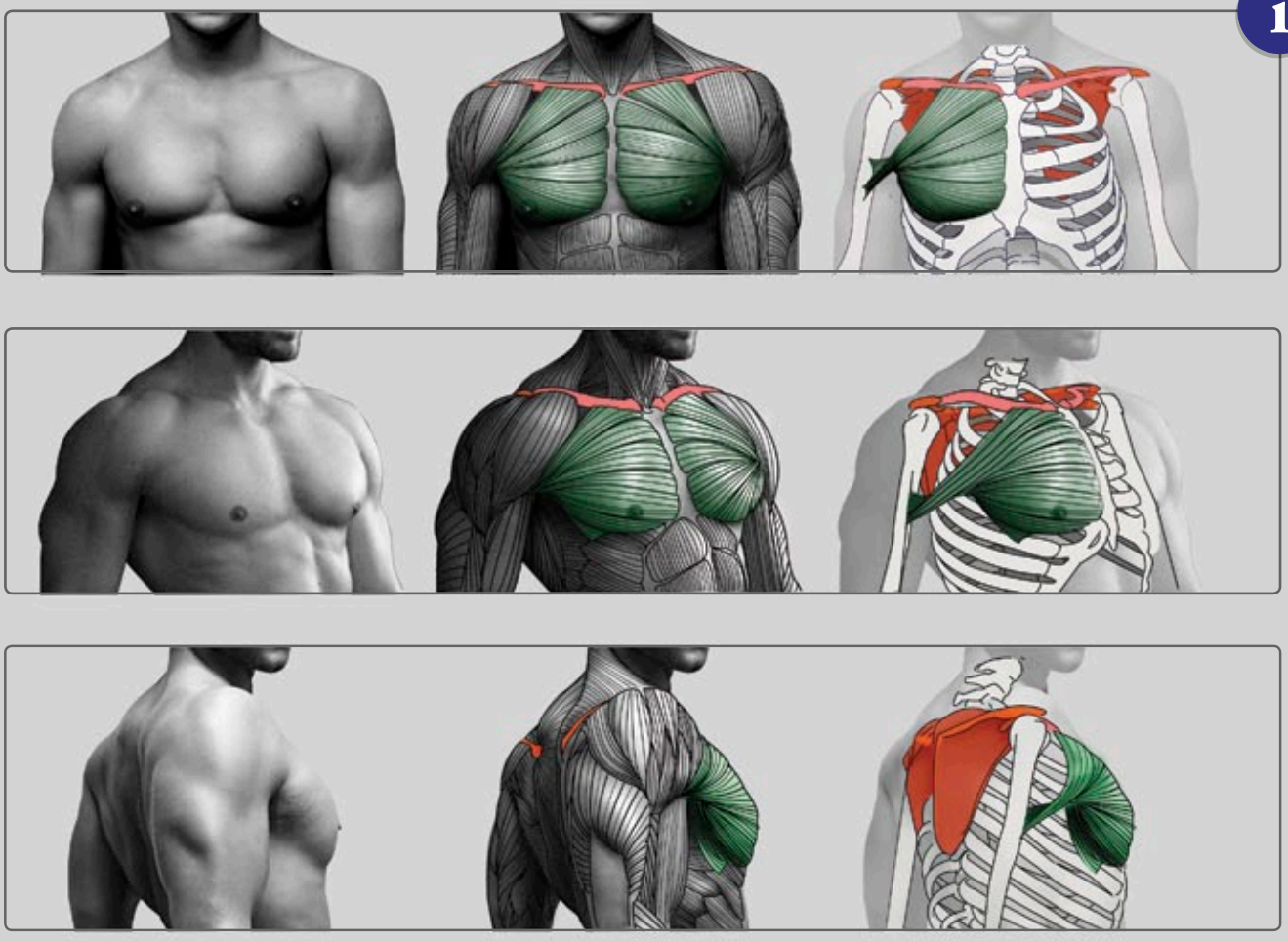
A: TO 3/5 OF **CLAVICLE**
B: TO **STERNUM** BONE
C: TO **RIBS**
D: LYING ON ABDOMINAL MUSCLES

A: THIS PORTION IS OFTEN VISIBLE AS SEPARATE PART OF PM.

HOLLOW AREA BETWEEN PM AND DELTOID IS ALWAYS VISIBLE!



PM IS PARTIALLY COVERED BY DELTOID MUSCLE.



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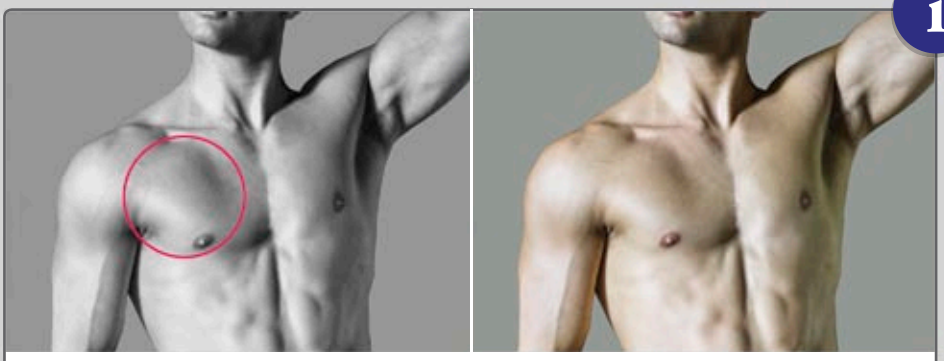
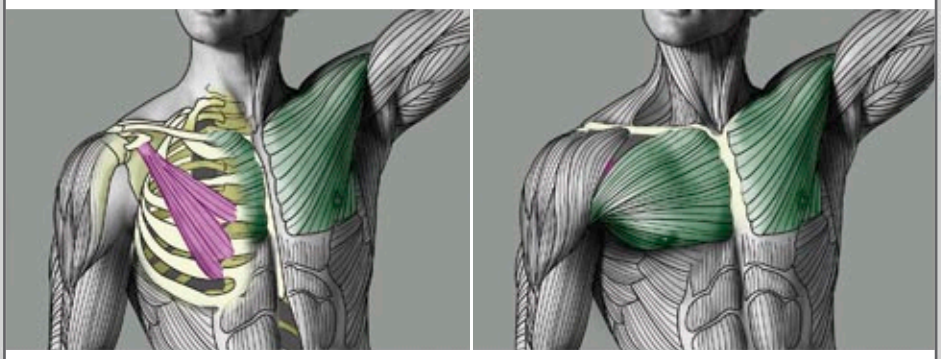
WHAT IS THIS BULGE?

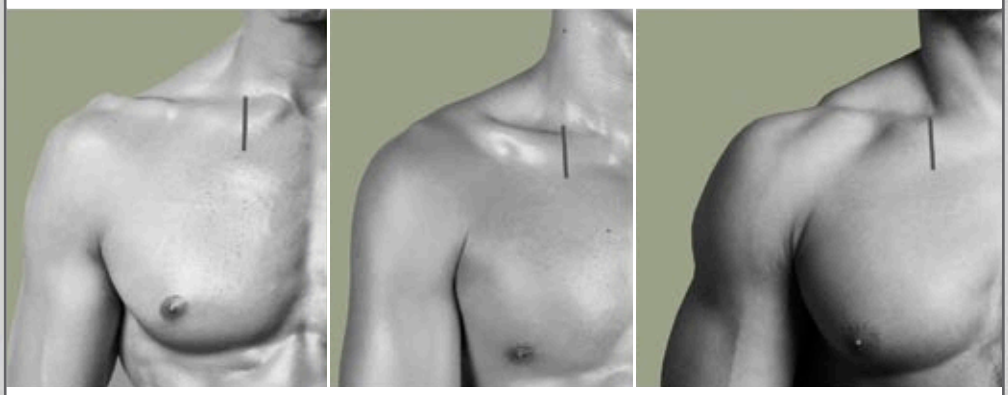


THE PECTORALIS MINOR MUSCLE PUSHING **PECTORALIS MAJOR** OUTWARD FROM UNDERNEATH.



ORIGIN: STERNUM ENDS AT 3-5 RIBS
INSERTION: CORACOID PROCESS OF SCAPULA
ACTION: MOVES SHOULDER BLADE FORWARD AND DOWNWARD

AS **CHEST MUSCLES** BECOME MORE DEVELOPED, LESS **COLLAR BONE (CLAVICLE)** IS VISIBLE.



CROSS SECTION OF **COLLAR BONE (CLAVICLE)** AND **CHEST MUSCLE (PECTORALIS MAJOR)**.

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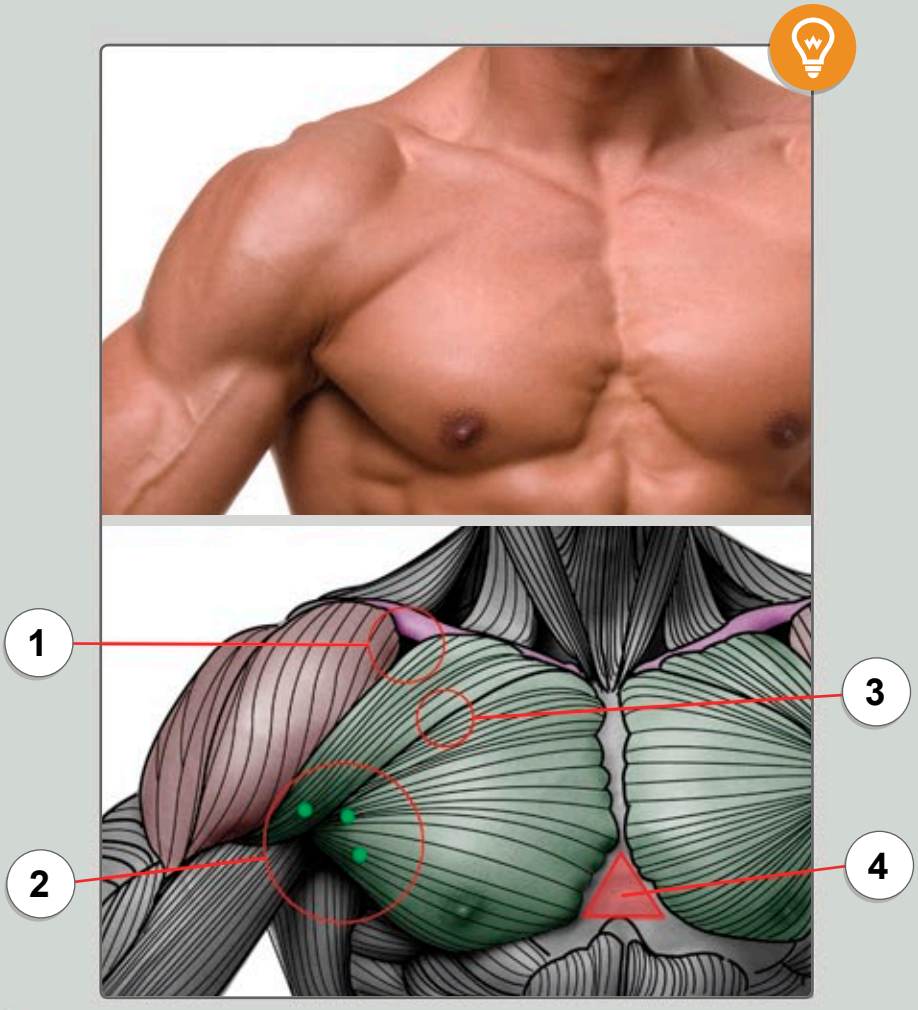
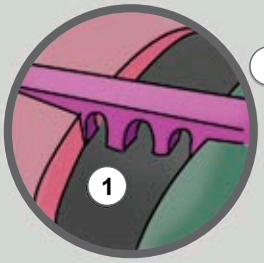
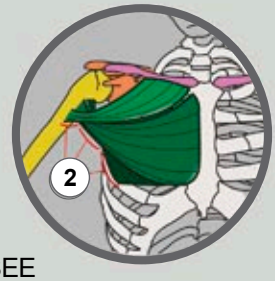
CHEST AND SHOULDER FEATURES





1 **COLLARBONE (CLAVICLE)** IS LIKE A BRIDGE OVER A VALLEY. UNDERNEATH THE COLLARBONE IS THE **INFRACLAVICULAR TRIANGLE (INFRACLAVICULAR FOSSA)**, WHICH IS A PIT BETWEEN **THE CHEST MUSCLE (PECTORALIS MAJOR)** AND **SHOULDER MUSCLE (DELTOID).** THE **COLLARBONE (CLAVICLE)** IS ALWAYS VISIBLE.



2 EACH BODY ●●● OF **THE CHEST MUSCLE (PECTORALIS MAJOR)** HAS DIFFERENT INSERTIONS ON **THE HUMERUS**. FIBERS CHANGE DIRECTIONS, CROSSING OVER EACH OTHER AND CREATING **MULTIPLE MASSES ON THE EDGE OF THE ARMPIT.**

3 SOMETIMES IN VERY MUSCULAR INDIVIDUALS, YOU CAN SEE A SEPARATION BETWEEN THE **CLAVICULAR SECTION** AND **STERNAL SECTION** OF THE **CHEST MUSCLE (PECTORALIS MAJOR).**

4 **BONY TRIANGLE** BETWEEN **CHEST MUSCLES** AND **ABDOMINAL SIX-PACK.**

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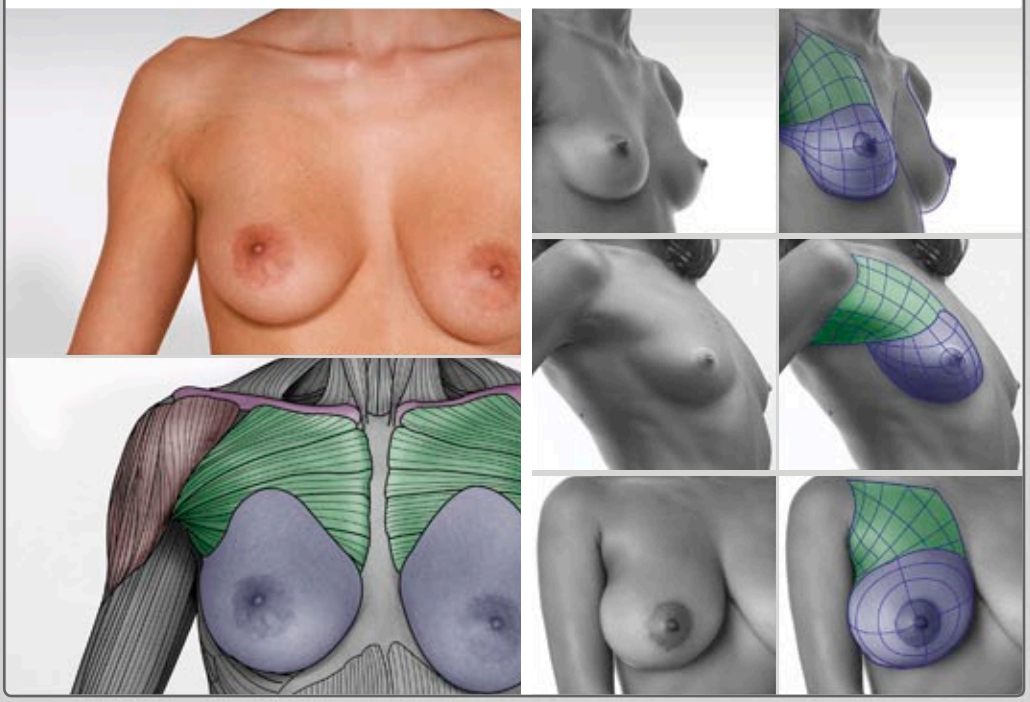
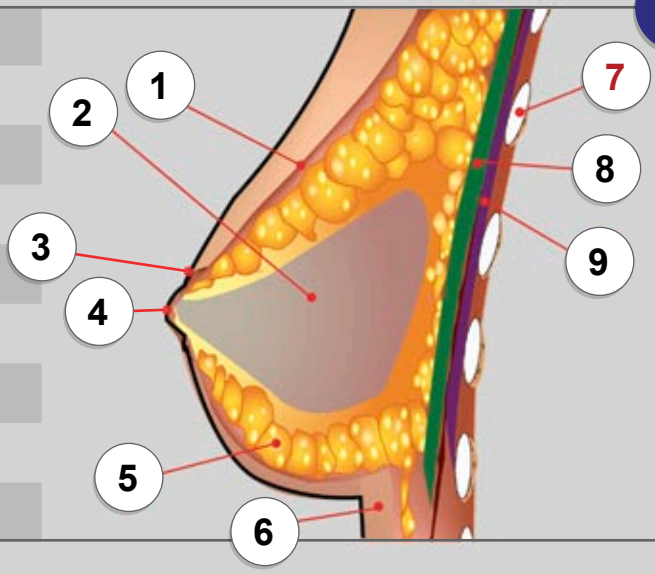
FEMALE BREAST

IMAGINING THE SEPARATION BETWEEN **BREASTS** AND **PECTORAL MUSCLES** MAY HELP YOU SCULPT THEM CORRECTLY.



1	SUBCUTANEOUS FAT PAD
2	LOBULES
3	AREOLA
4	NIPPLE
5	PECTORAL FAT PAD
6	SKIN
7	**RIBS**
8	**PECTORALIS MAJOR**
9	**PECTORALIS MINOR**



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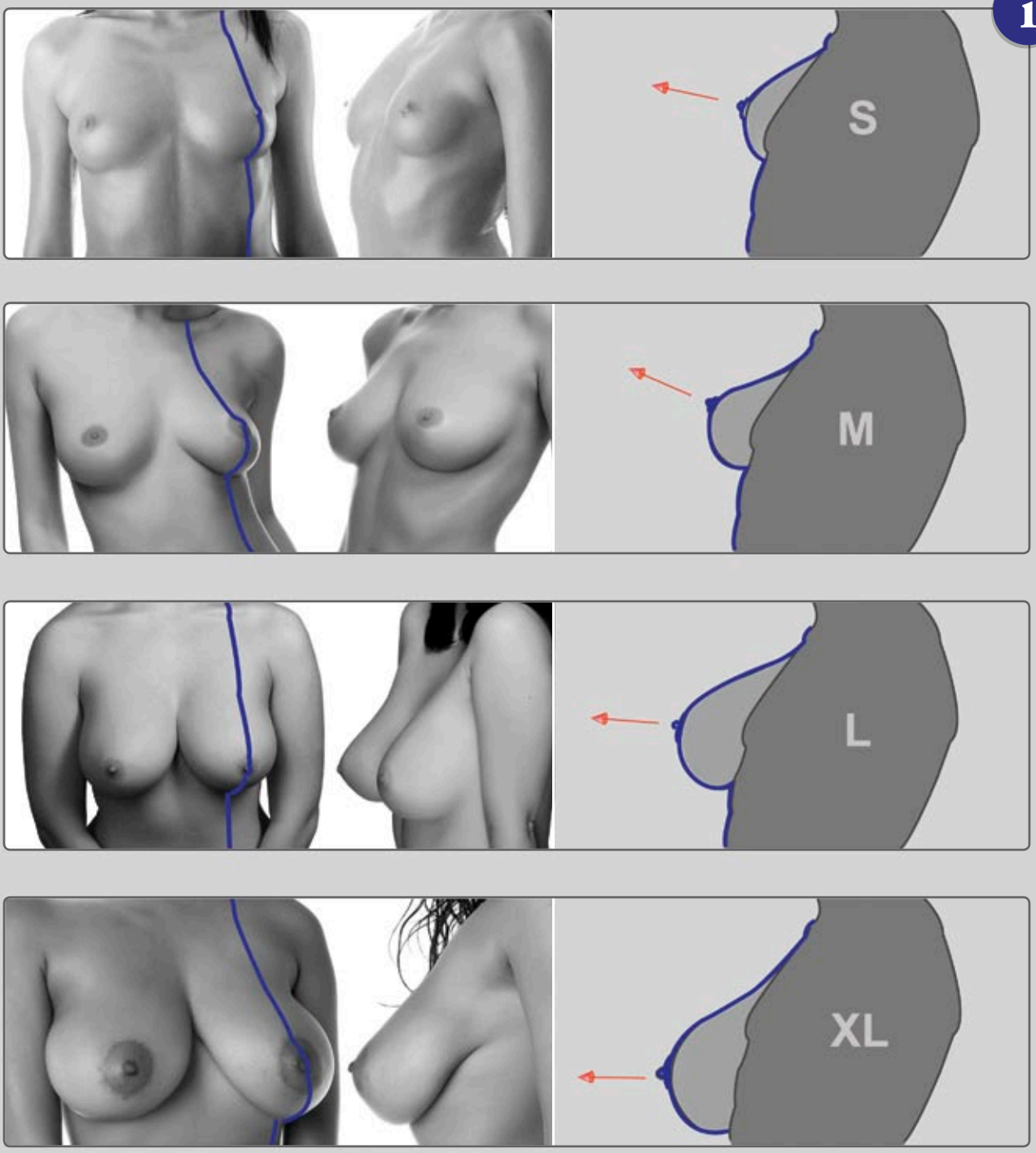
FEMALE BREAST ANGLES VARY DEPENDING ON SHAPE AND SIZE



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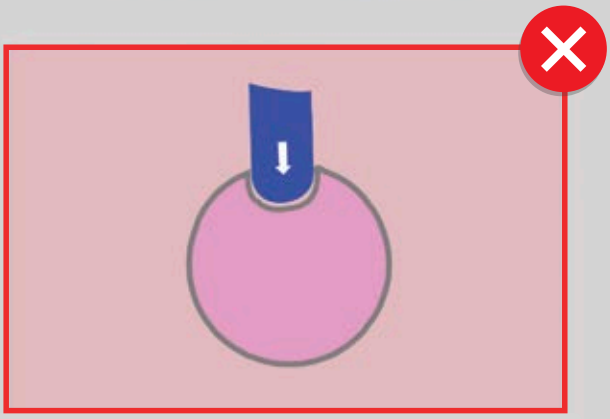
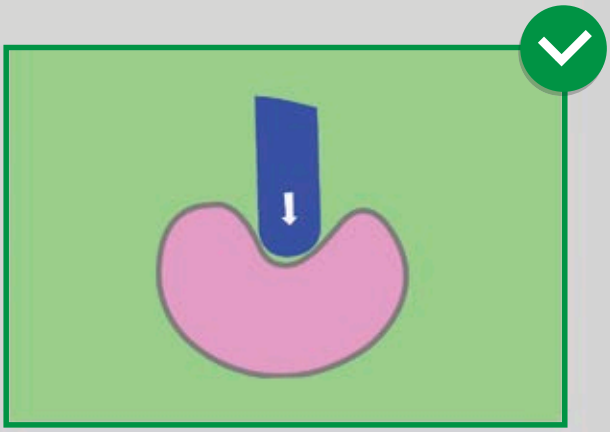
BREAST VOLUME AND POSITIONING

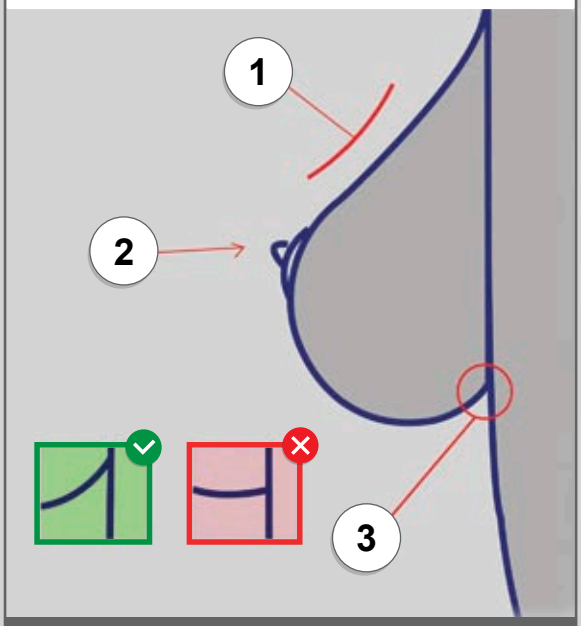
ALTHOUGH THE SHAPE CHANGES, VOLUME REMAINS CONSTANT.

THE LARGER THE BREASTS, THE MORE THEY ARE SHAPED BY GRAVITY WHEN A WOMAN IS LYING ON HER BACK.





3 TIPS ON HOW TO MAKE FEMALE BREASTS LOOK YOUTHFUL.



1. TOP SIDE: STRAIGHT OR CONCAVE, BUT NEVER CONVEX
2. NIPPLE POINTS UPWARD
3. LIFT LOWER BORDER WHERE BREAST CONNECTS TO CHEST WALL

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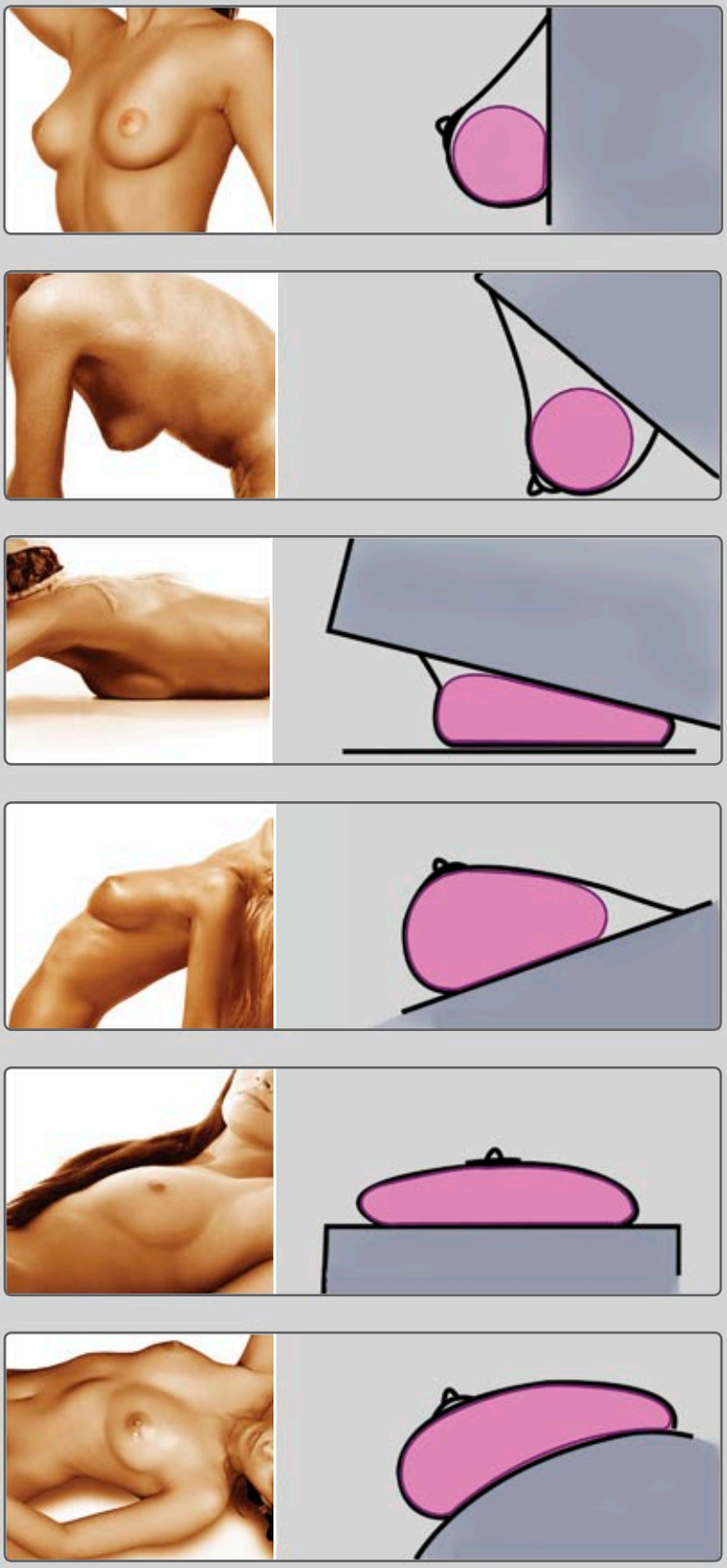
WEIGHT AND MASS DISTRIBUTION OF FEMALE BREAST



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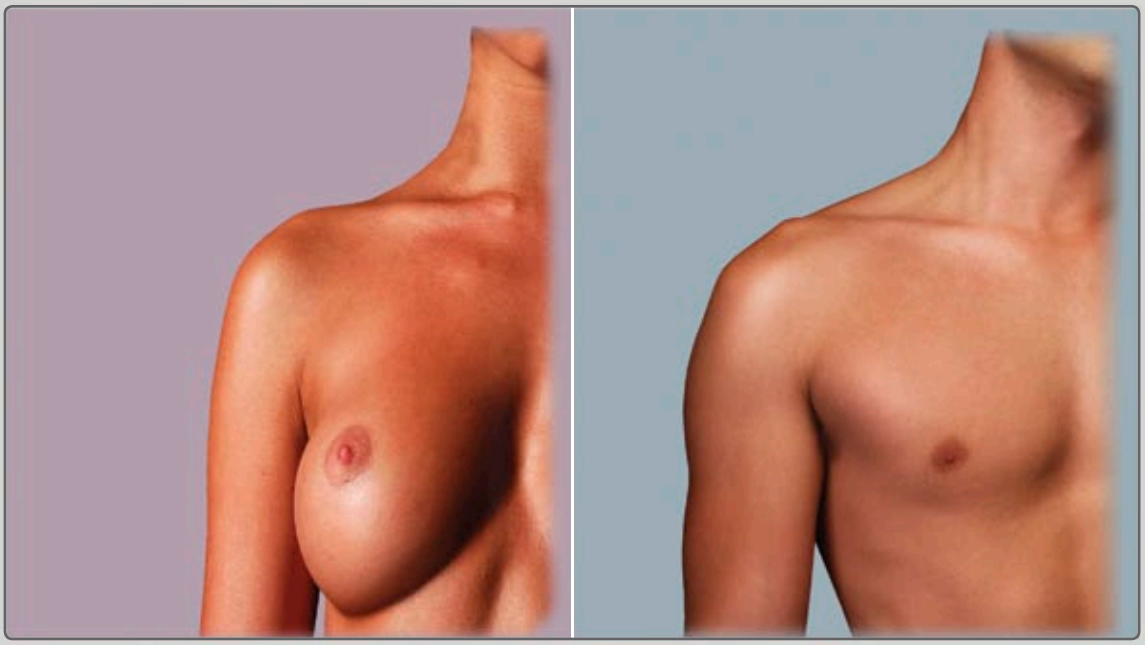
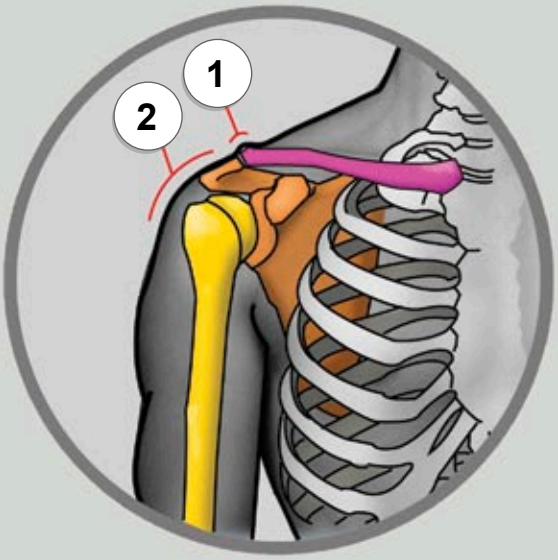
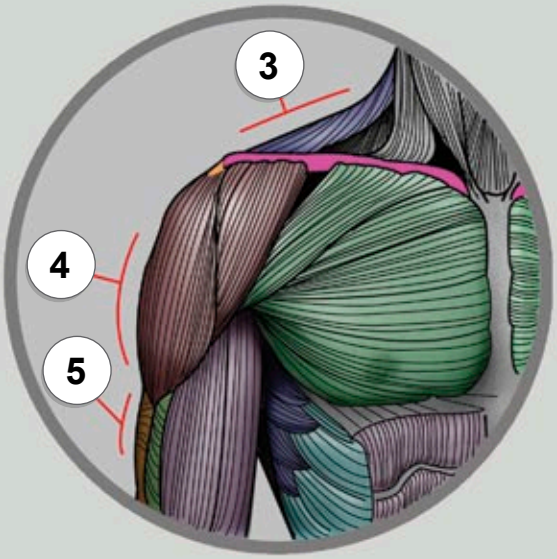
WHAT CREATES A SHOULDER'S SILHOUETTE?



BONES



MUSCLES



1. LATERAL END OF **COLLARBONE (CLAVICLE)**
2. HEAD OF **HUMERUS** PUSHES **SHOULDER MUSCLE (DELTOID)** OUTWARD.
3. **TRAPEZIUS**
4. LATERAL HEAD OF **SHOULDER MUSCLE (DELTOID)**
5. LATERAL HEAD OF **TRICEPS**

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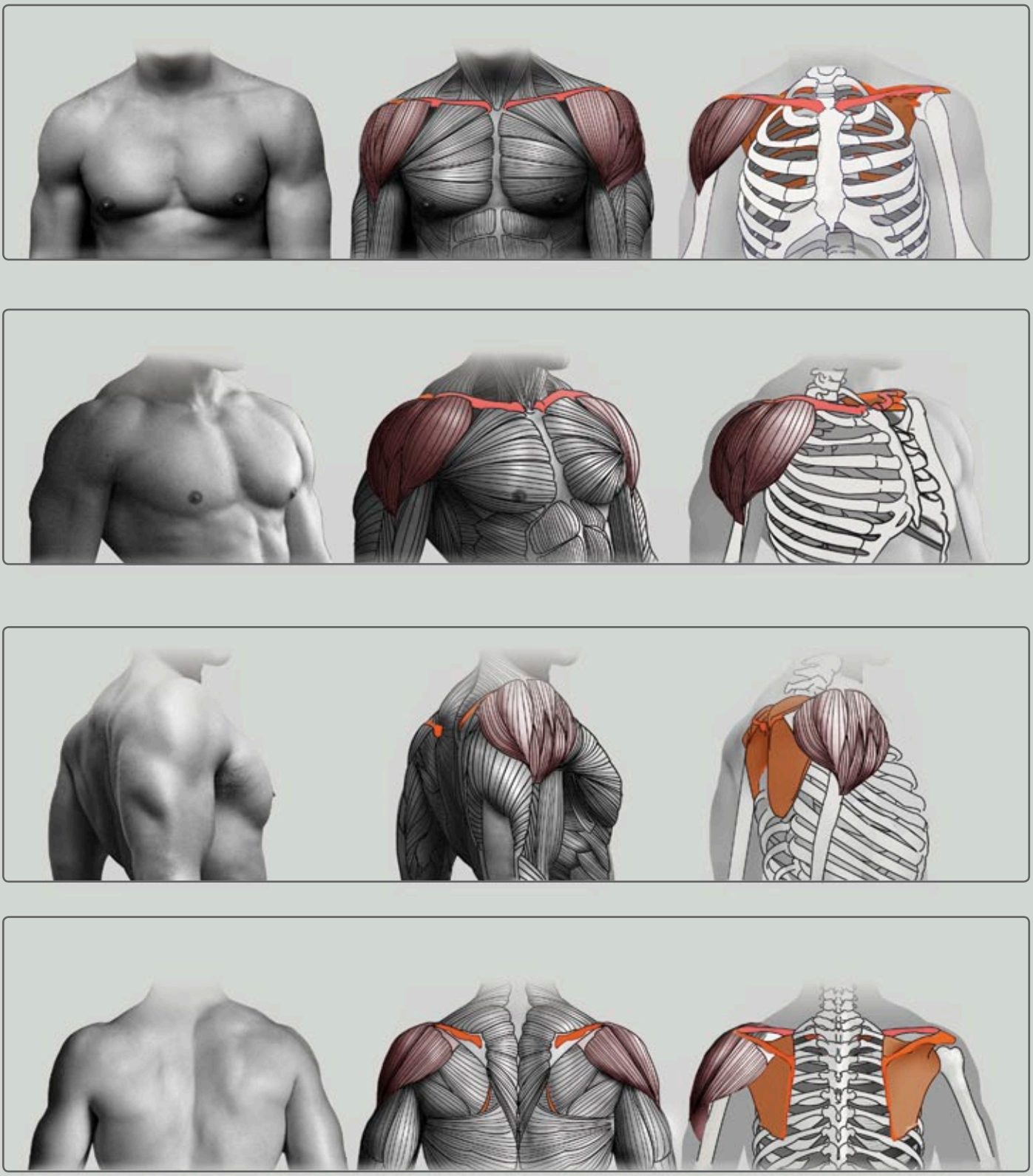
SHOULDER MUSCLE

(DELTOID)



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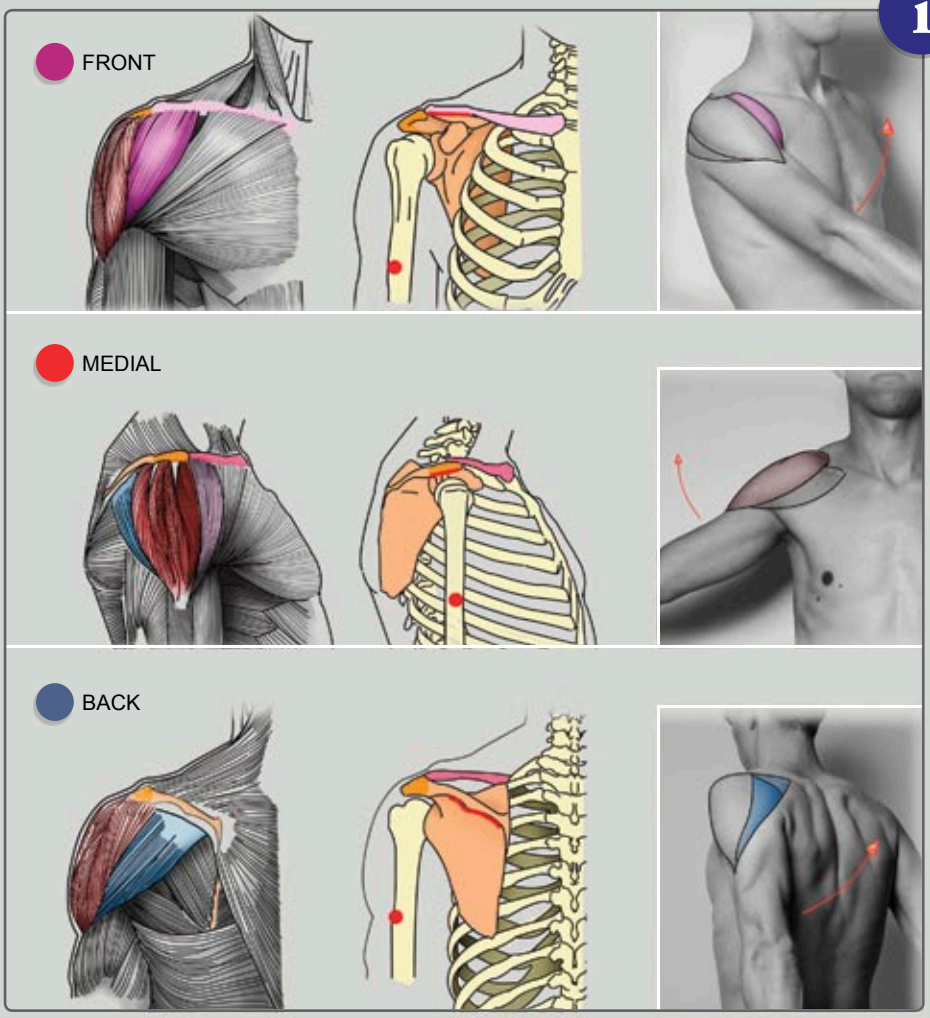
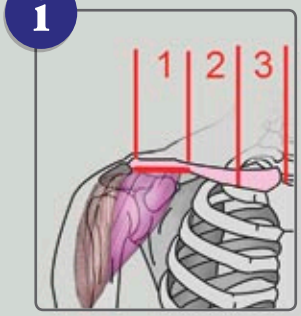
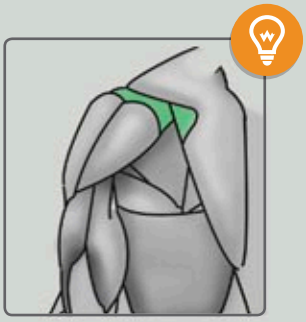
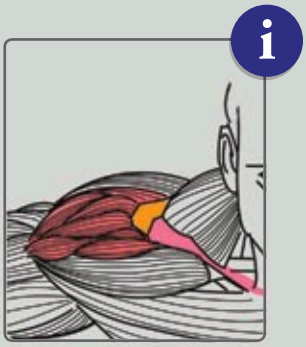
SHOULDER MUSCLE (DELTOID) HAS 3 SECTIONS:

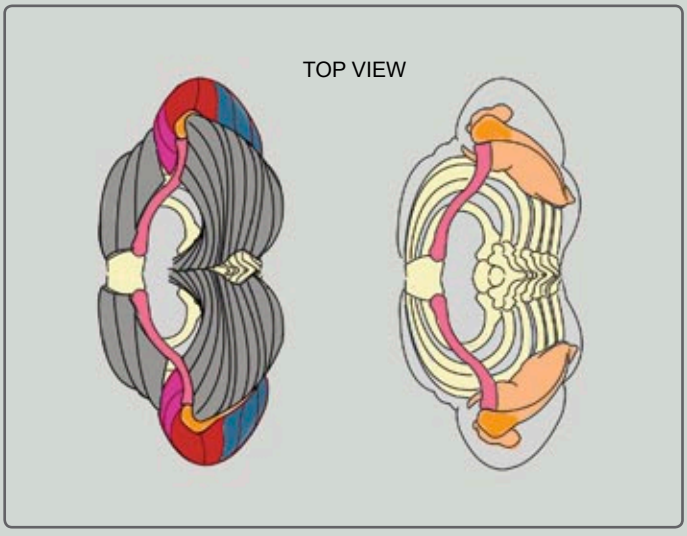
FRONT (ANTERIOR PART), MEDIAL (LATERAL PART) AND BACK (POSTERIOR PART)

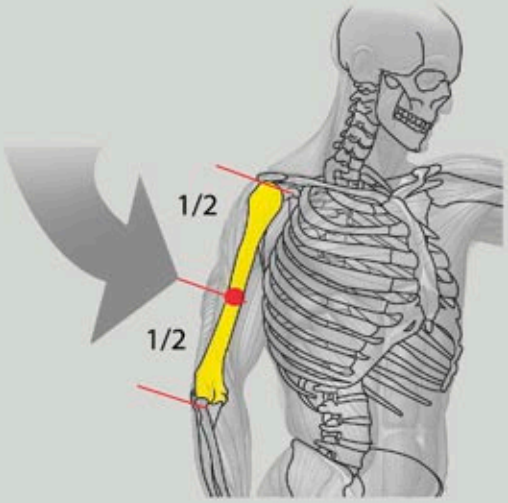












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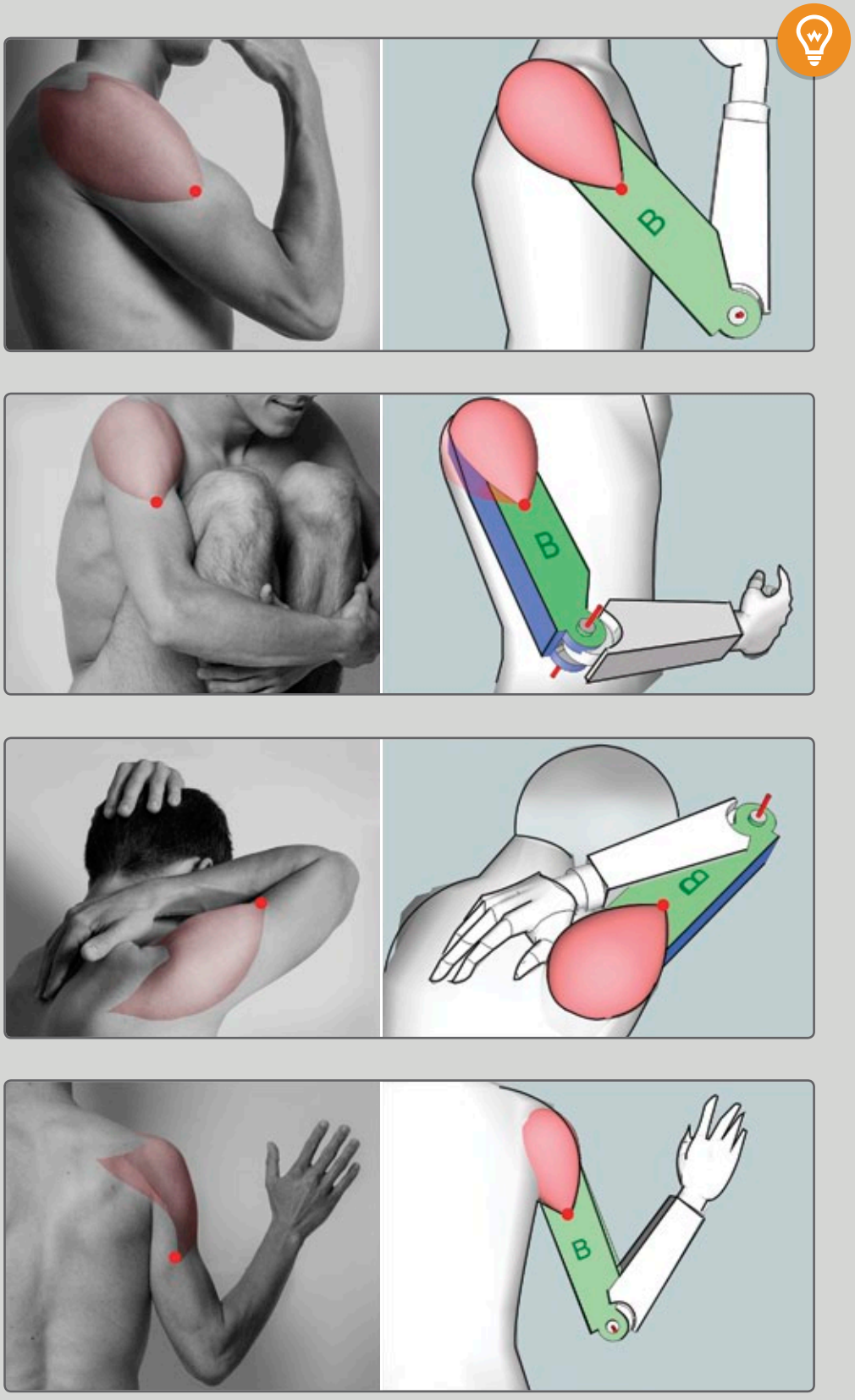
WHICHEVER WAY YOU TURN YOUR ARM, THE DELTOID'S LOWER, TAPERED END IS ALWAYS ON THE "B" SURFACE!



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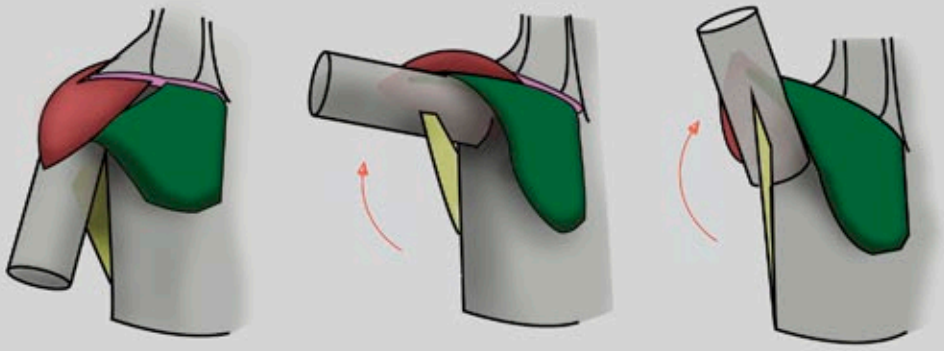
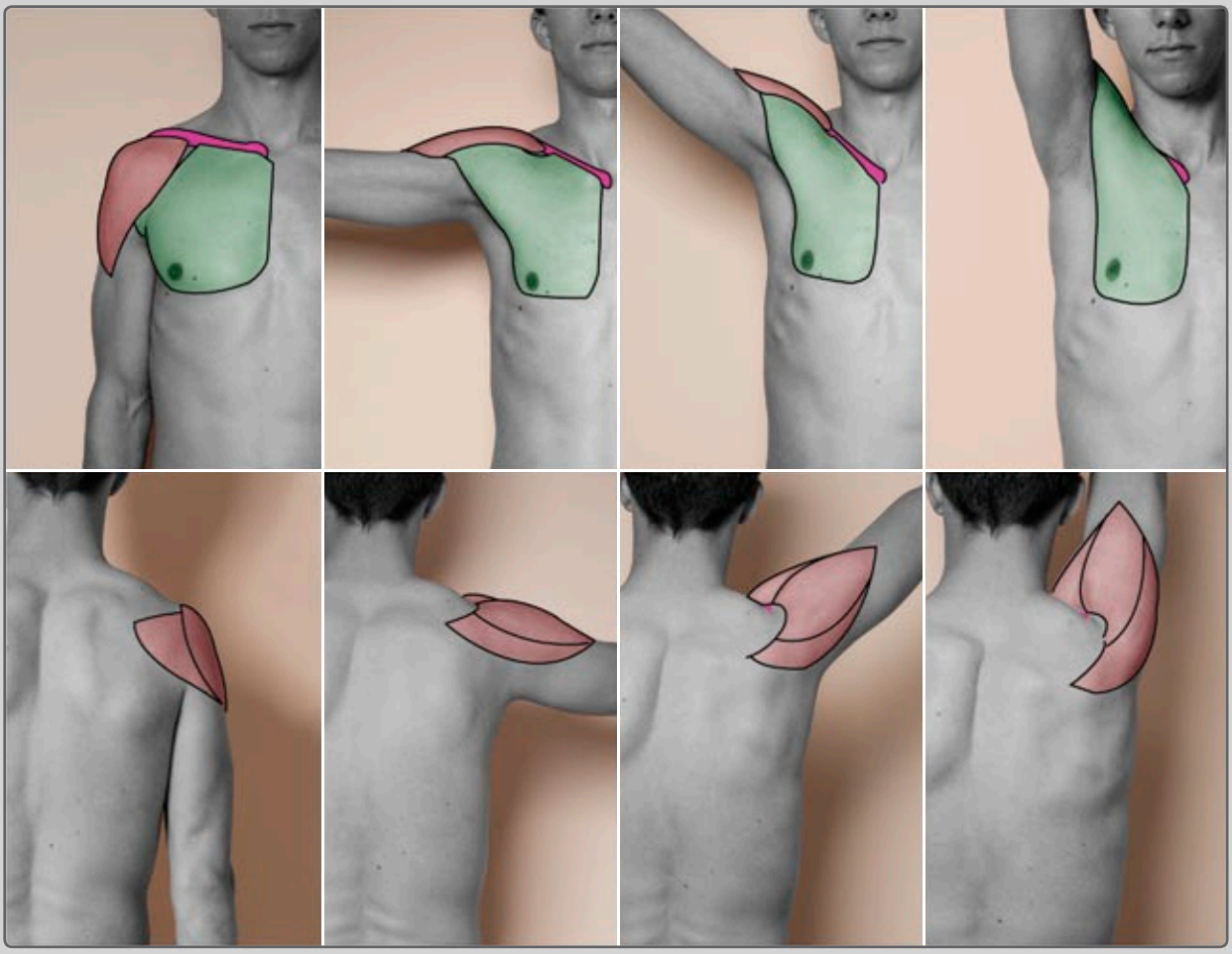
WHERE DOES IT GO?

WHERE DOES THE SHOULDER MUSCLE (DELTOID) DISAPPEAR TO WHEN THE ARM IS LIFTED UP? IT JUST TURNS TOWARD THE BACK AND YOU WILL SEE IT IF YOU LOOK FROM THE OTHER SIDE.

THE CLAVICLE IS ONLY COVERED BY SKIN. IT IS ALWAYS VISIBLE EXCEPT WHEN ARMS ARE LIFTED. THEN, THE CLAVICLE IS HIDDEN BEHIND THE GREAT CHEST MUSCLE (PECTORALIS MAJOR).





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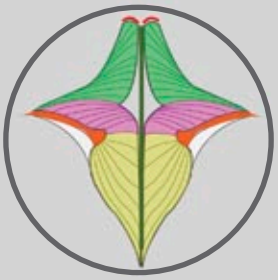
TRAPEZIUS MUSCLE

ORIGIN: MEDIAL SUPERIOR NUCHAL LINE & EXTERNAL PROTUBERANCE OF THE SKULL

INSERTION: LATERAL CLAVICLE, ACROMION AND SPINE OF SCAPULA



ACTIONS:

UPPER FIBERS: ELEVATE AND UPWARDLY ROTATE SCAPULA; EXTEND NECK

MIDDLE FIBERS: ADDUCT (RETRACT) SCAPULA

LOWER FIBERS: DEPRESS AND HELP UPPER FIBERS UPWARDLY ROTATE SCAPULA

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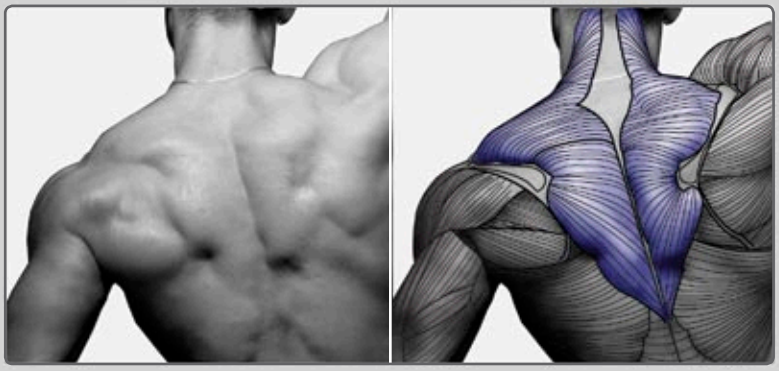
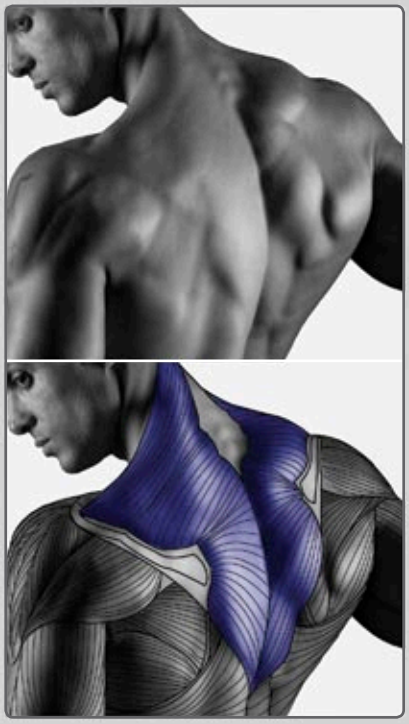
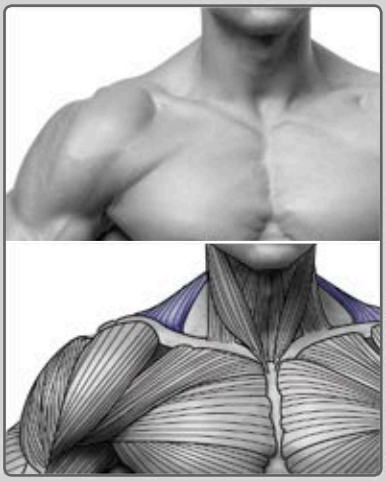
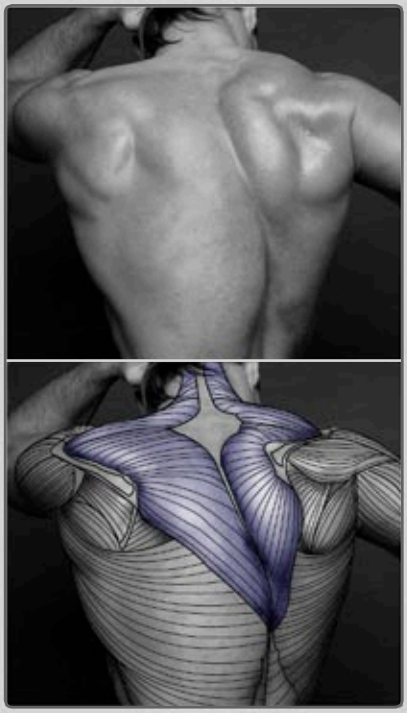
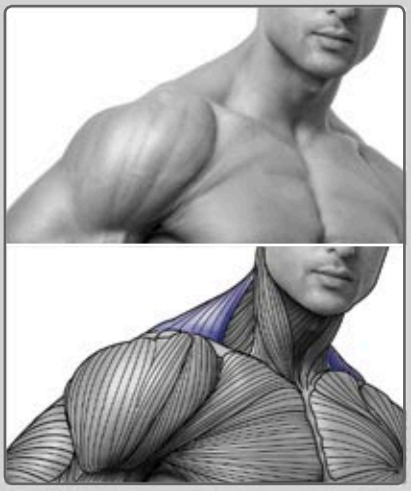
TRAPEZIUS MUSCLE

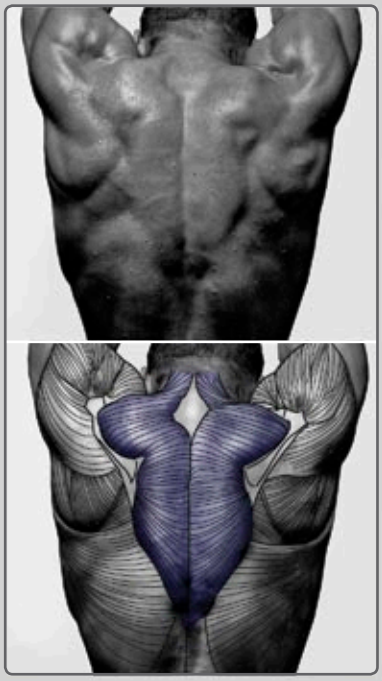


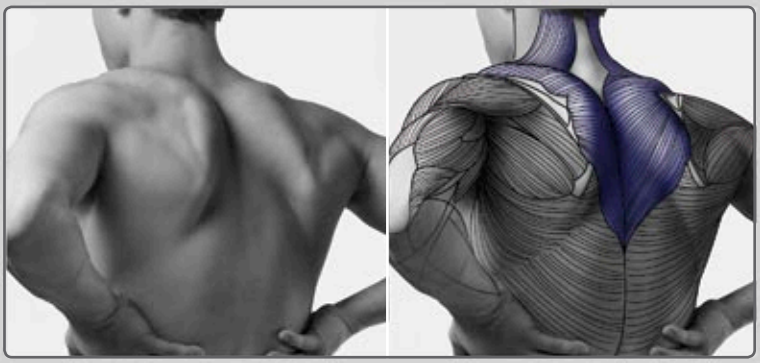












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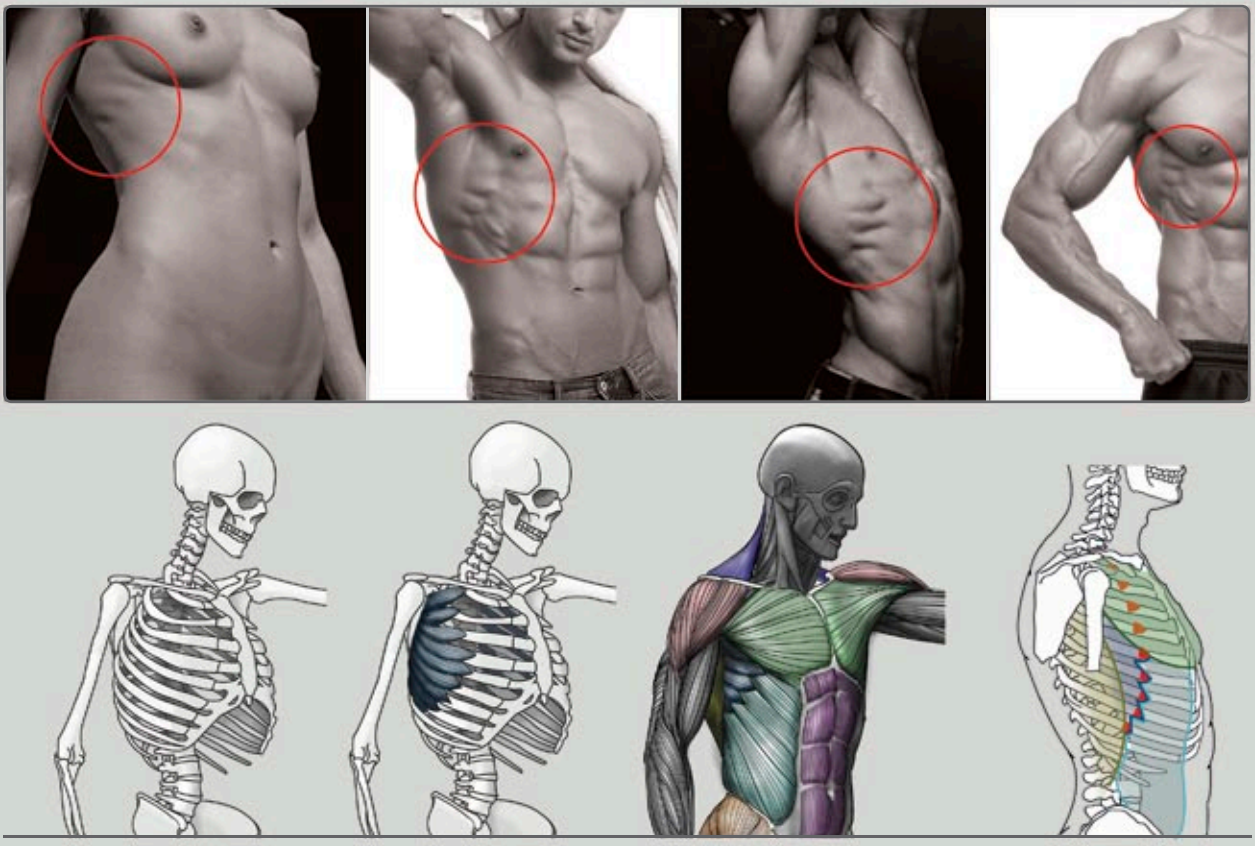
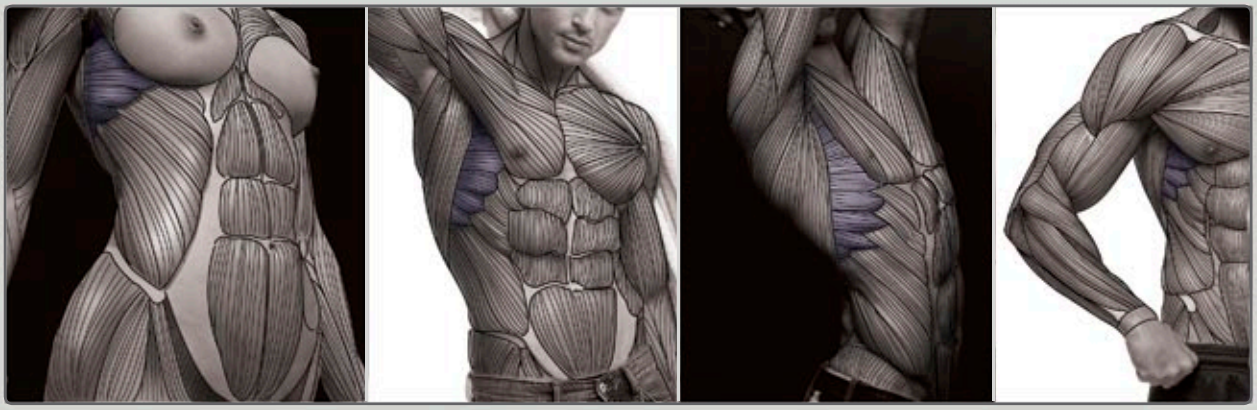
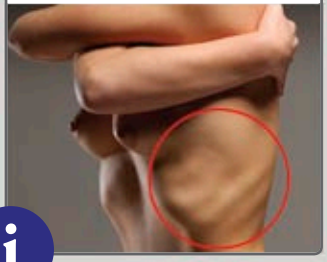
ARE THESE RIBS?

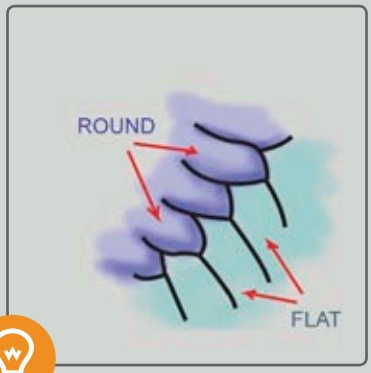


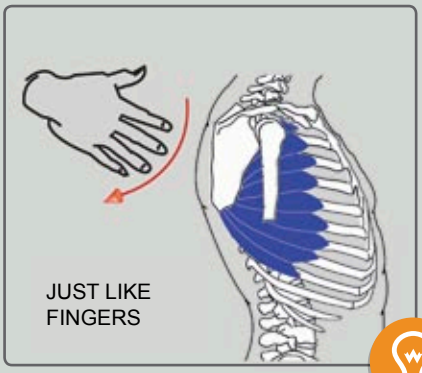
THIS IS A MUSCLE, CALLED **SERRATUS ANTERIOR**



IF PERSON IS SKINNY, THEN **SERRATUS** IS TOO FLAT TO BE VISIBLE.







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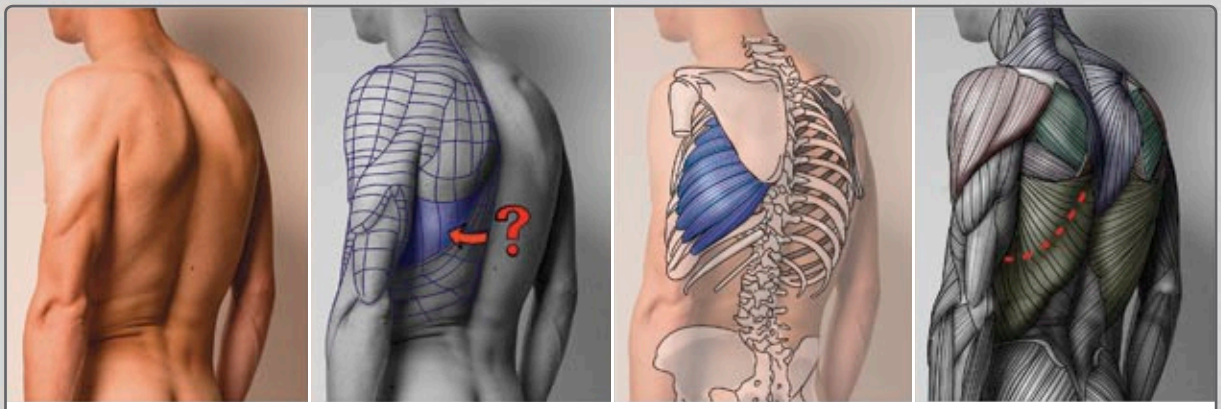
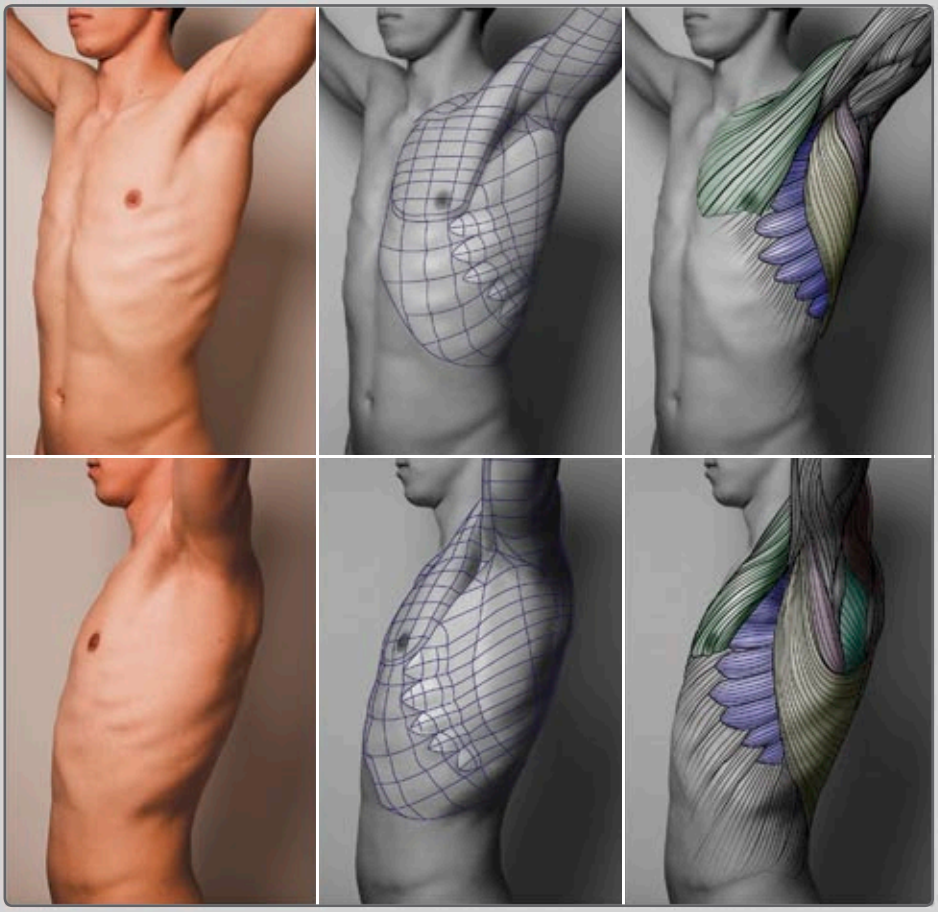
WHAT IS THIS BULGE UNDER THE SHOULDER BLADE?



IT IS **THE SERRATUS ANTERIOR** MUSCLE, PUSHING THE **LATISSIMUS DORSI** OUTWARD FROM BENEATH.

SERRATUS ANTERIOR IS A MUSCLE THAT ORIGINATES ON THE SURFACES OF THE **1ST** TO **8TH** RIBS ON THE LATERAL CHEST AND INSERTS ALONG THE ENTIRE ANTERIOR LENGTH OF THE MEDIAL BORDER OF THE SCAPULA.

1/4 AND SIDE VIEW



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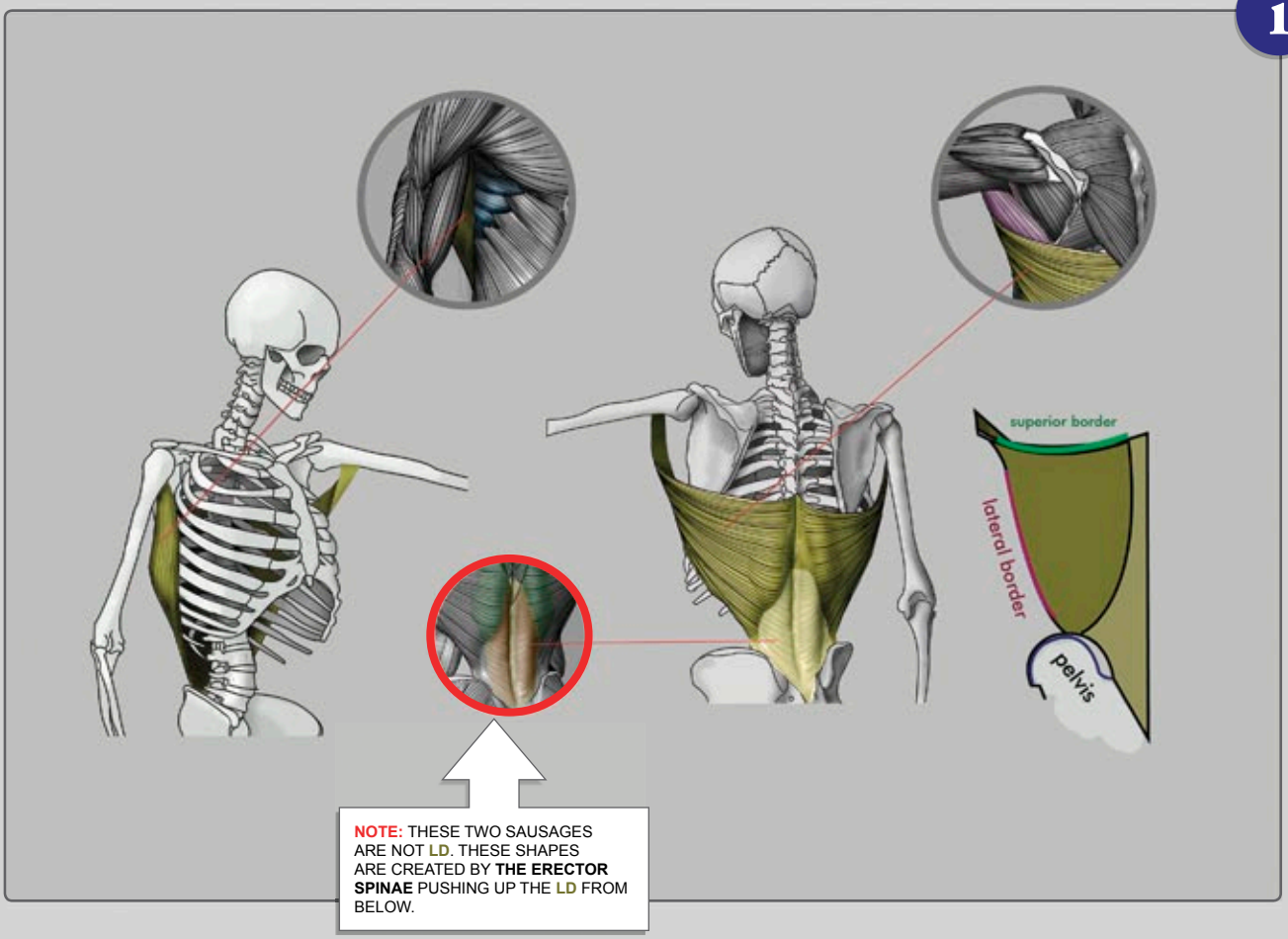
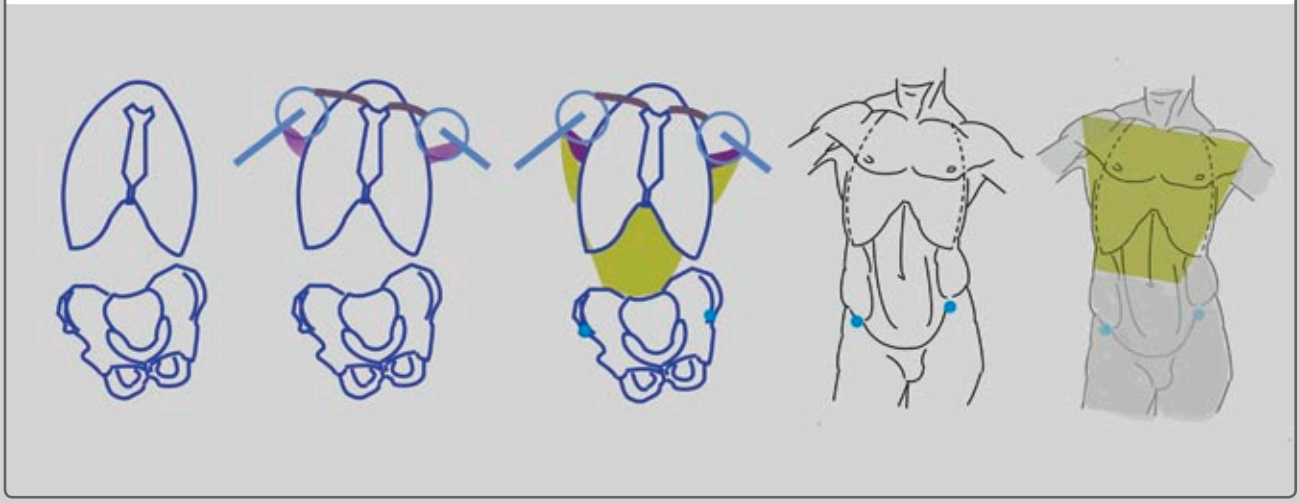
BROADEST MUSCLE OF THE BACK

(LATISSIMUS DORSI – LD)



TERES MAJOR COVERED WITH **LATISSIMUS DORSI** CREATES THE TRIANGULAR SHAPE OF A MALE TORSO.



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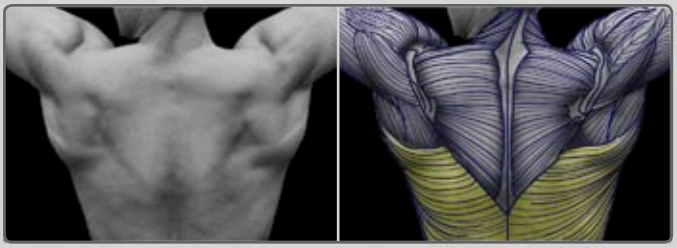
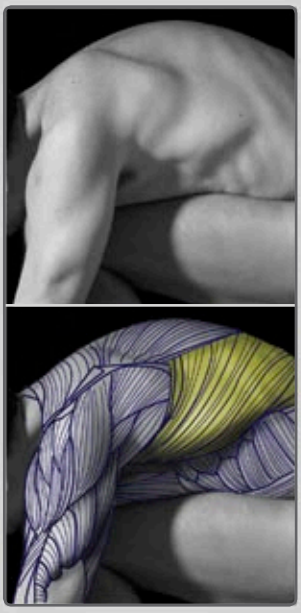
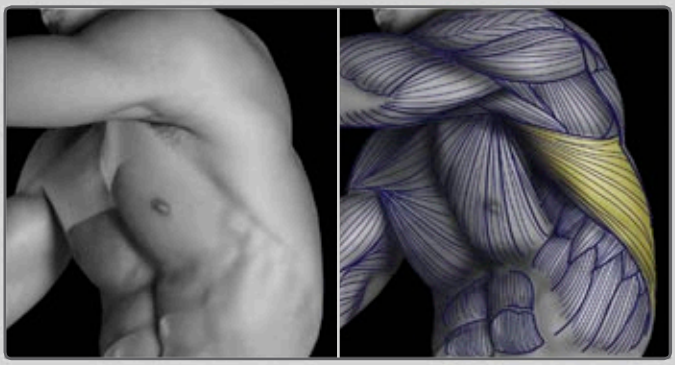
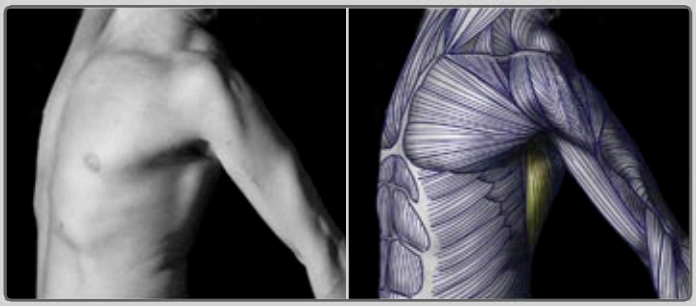
IDENTIFY THE BROADEST MUSCLE OF THE BACK!

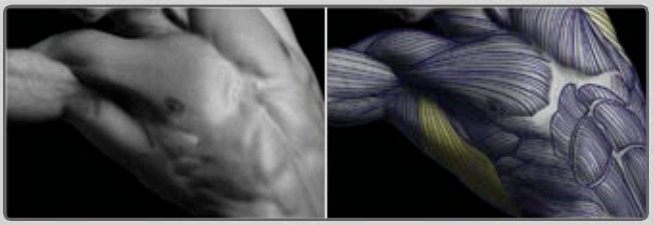
(LATISSIMUS DORSI)

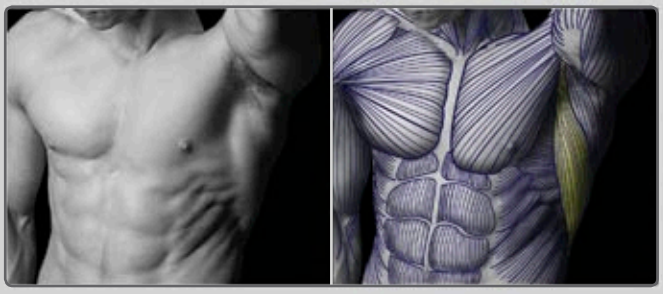












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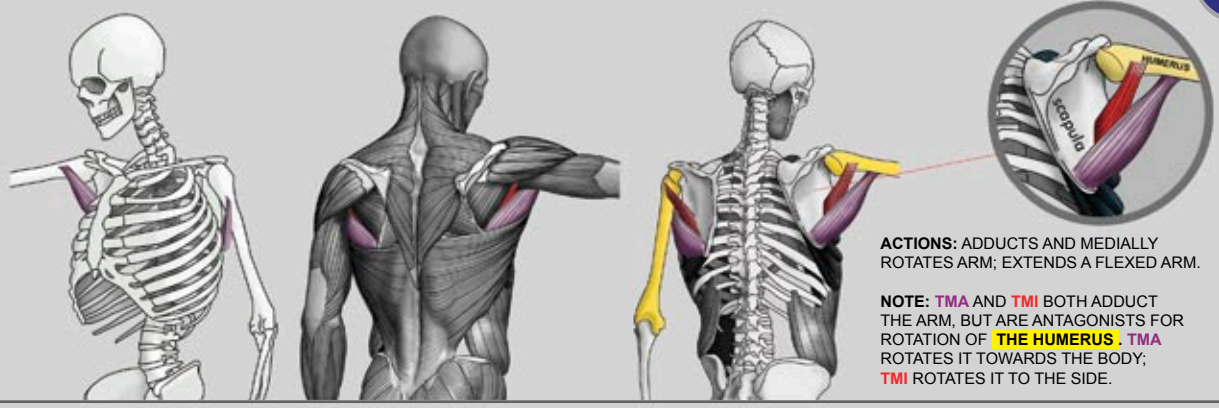
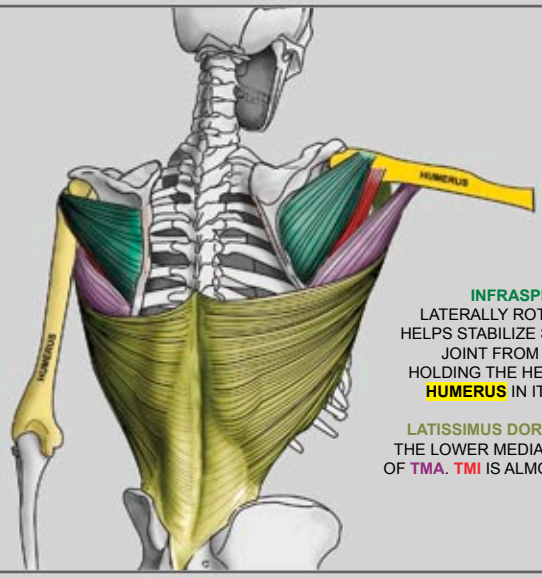
GREAT ROUND MUSCLE (TERES MAJOR TMA), LITTLE ROUND MUSCLE (TERES MINOR TMI) AND INFRASPINATUS MUSCLE (IS)



ACTIONS: ADDUCTS AND MEDIALLY ROTATES ARM; EXTENDS A FLEXED ARM.

NOTE: TMA AND TMI BOTH ADDUCT THE ARM, BUT ARE ANTAGONISTS FOR ROTATION OF **THE HUMERUS**. TMA ROTATES IT TOWARDS THE BODY; TMI ROTATES IT TO THE SIDE.

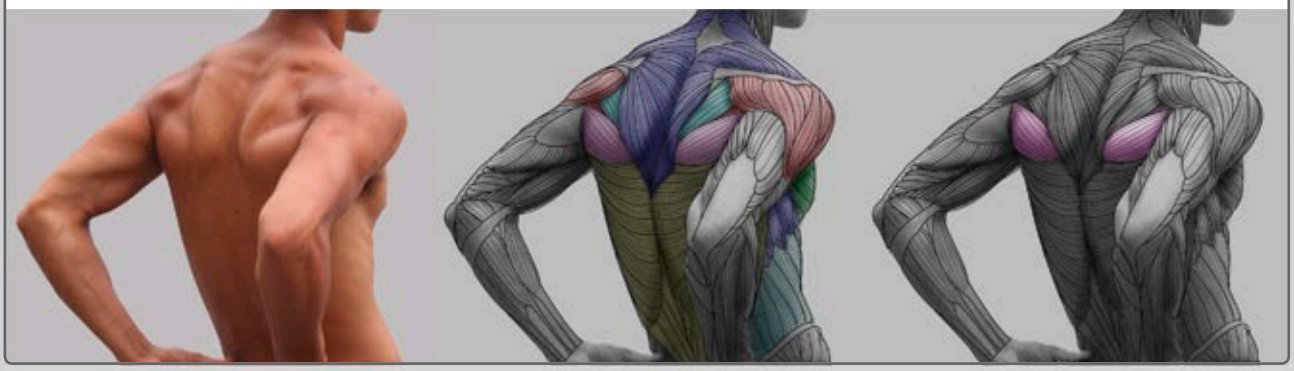


INFRASPINATUS (IS) LATERALLY ROTATES ARM; HELPS STABILIZE SHOULDER JOINT FROM BEHIND BY HOLDING THE HEAD OF **THE HUMERUS** IN ITS SOCKET.

LATISSIMUS DORSI COVERS THE LOWER MEDIAL PORTION OF TMA. TMI IS ALMOST NEVER VISIBLE.

TMI IS ALMOST NEVER VISIBLE.

GREAT ROUND MUSCLE (TERES MAJOR) BECOMES PRONOUNCED WHEN ARMS ARE HELD BEHIND THE TORSO.



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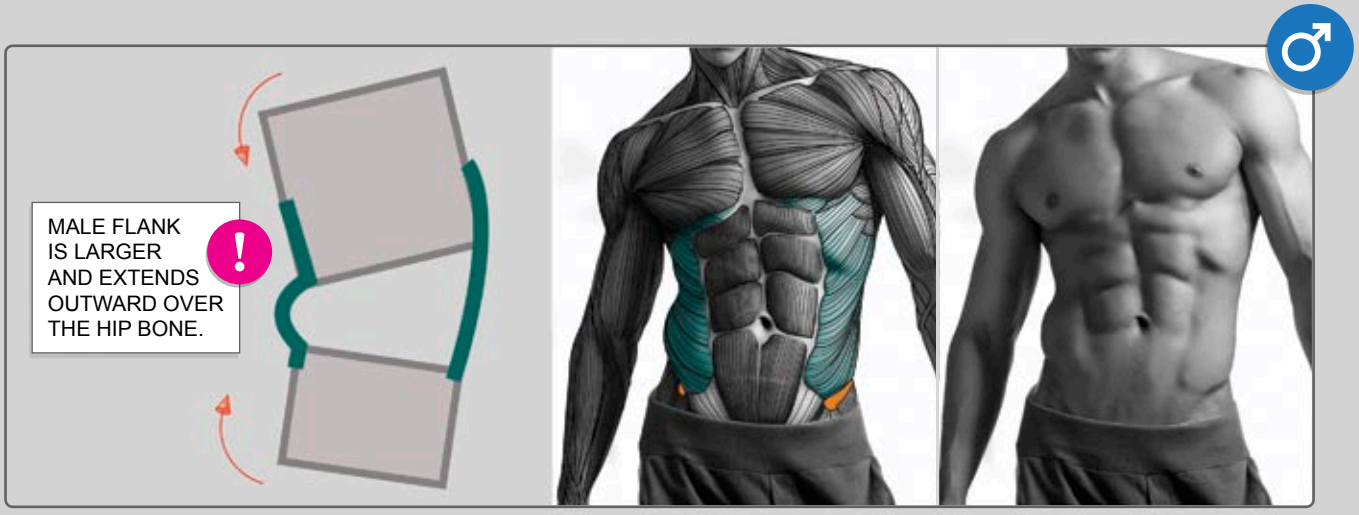
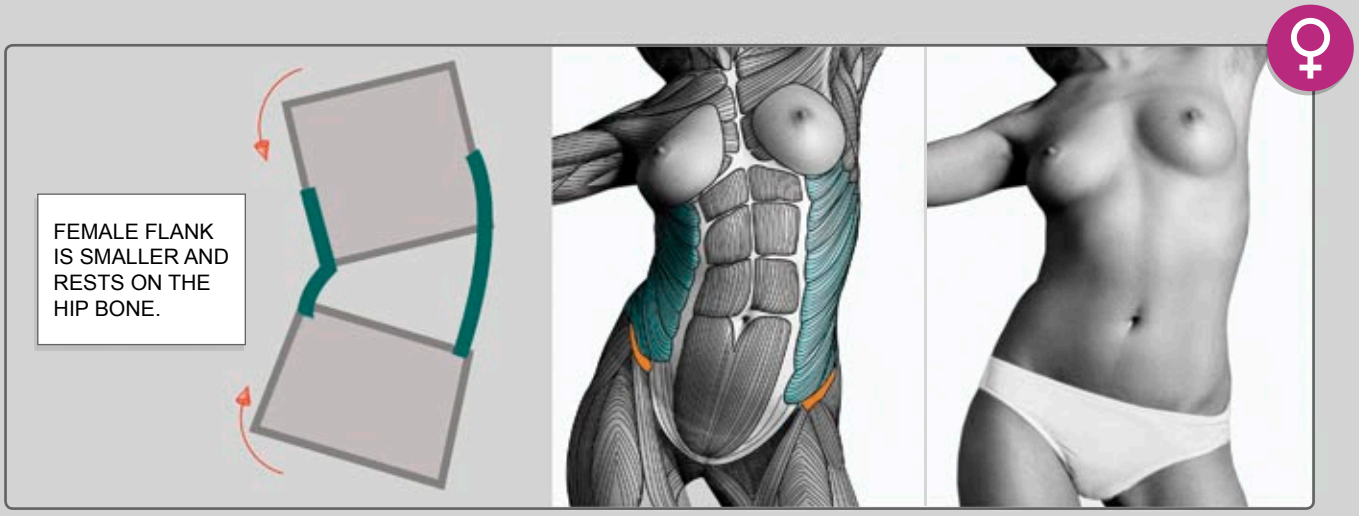
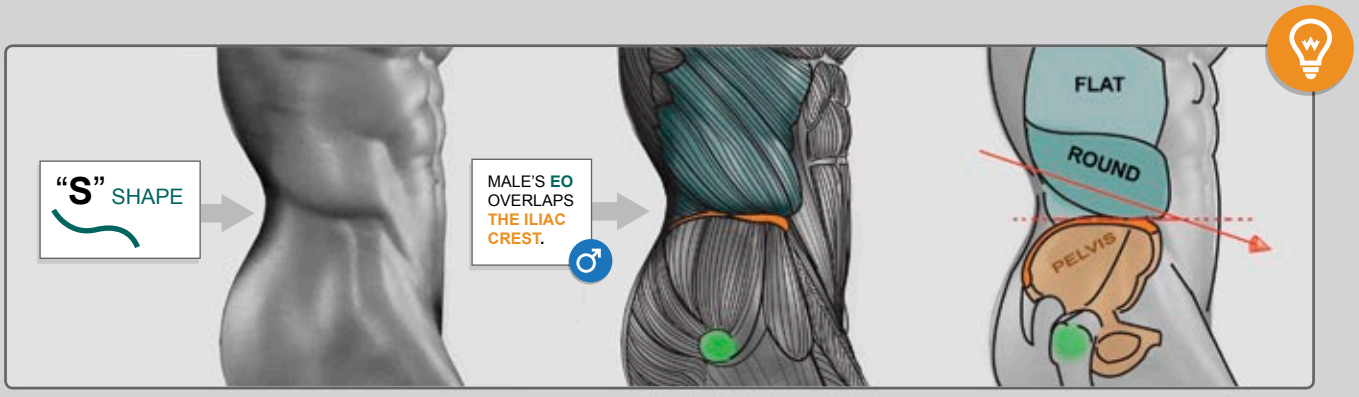
ABDOMINAL EXTERNAL OBLIQUE MUSCLE (EO)







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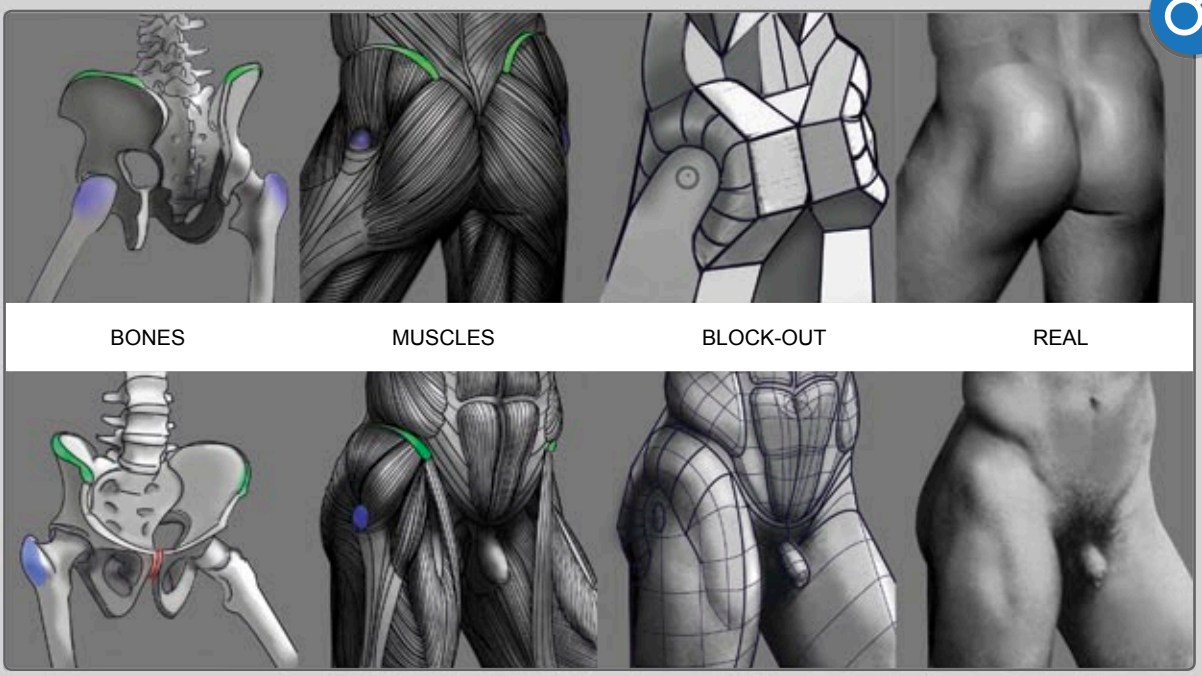
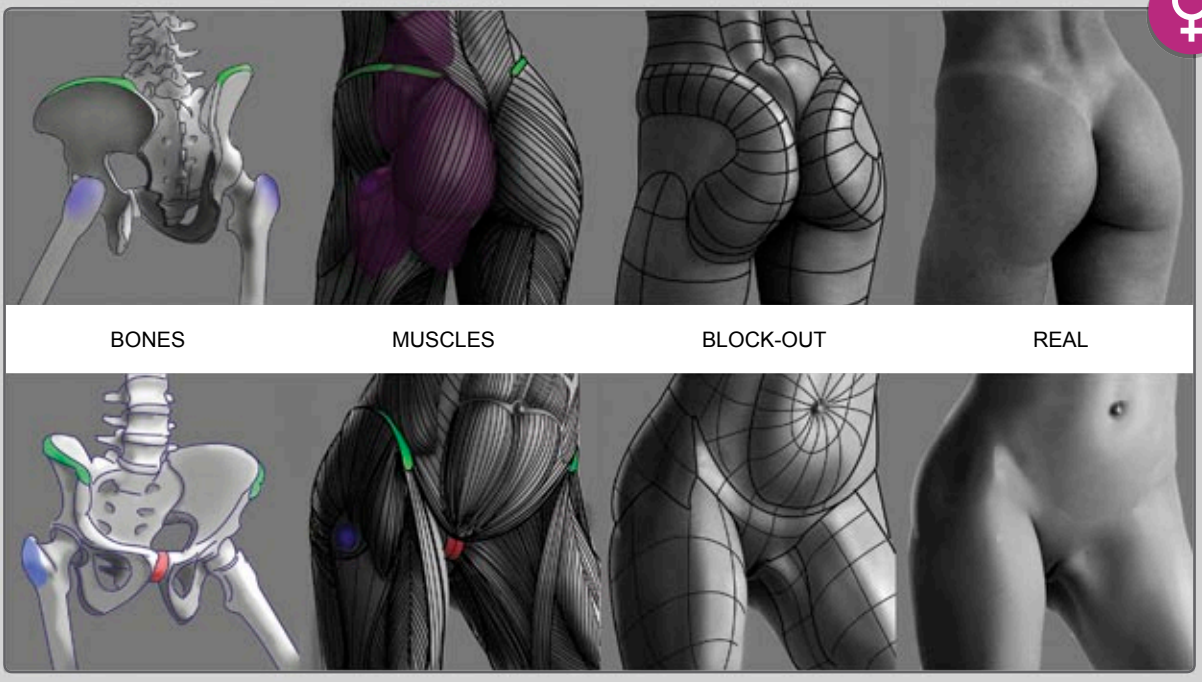
MALE AND FEMALE HIPS



GREATER TROCHANTER ILIAC CREST PUBIC SYMPHYSIS



SUBCUTANEOUS **FAT PADS** UNDER THE SKIN GIVE FEMALE HIPS THEIR CURVY SHAPE.

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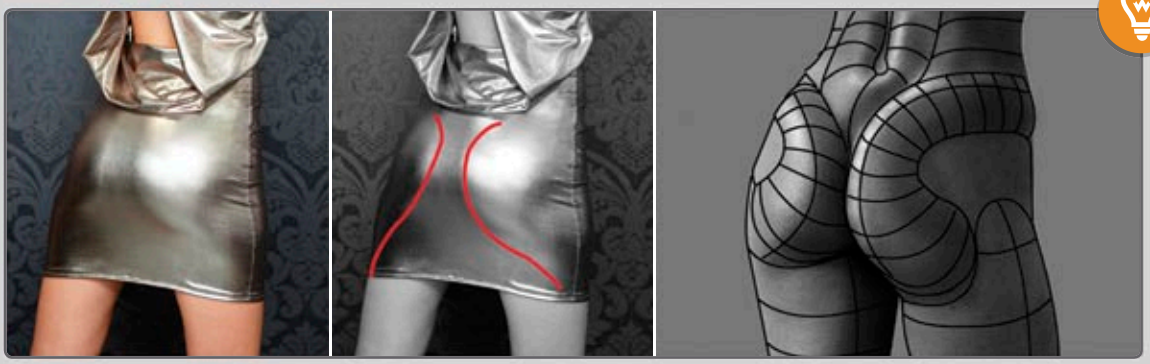
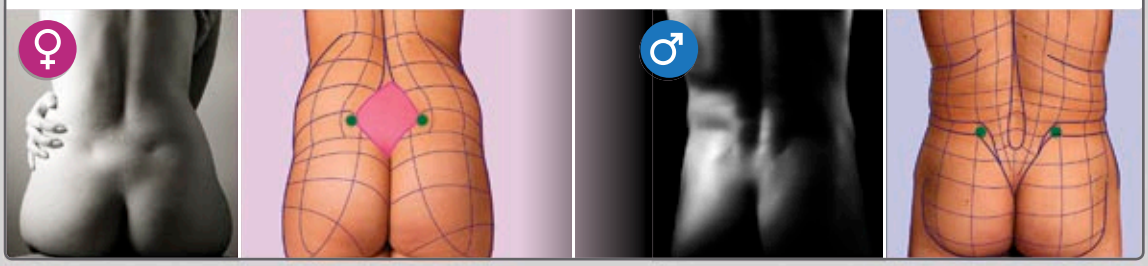
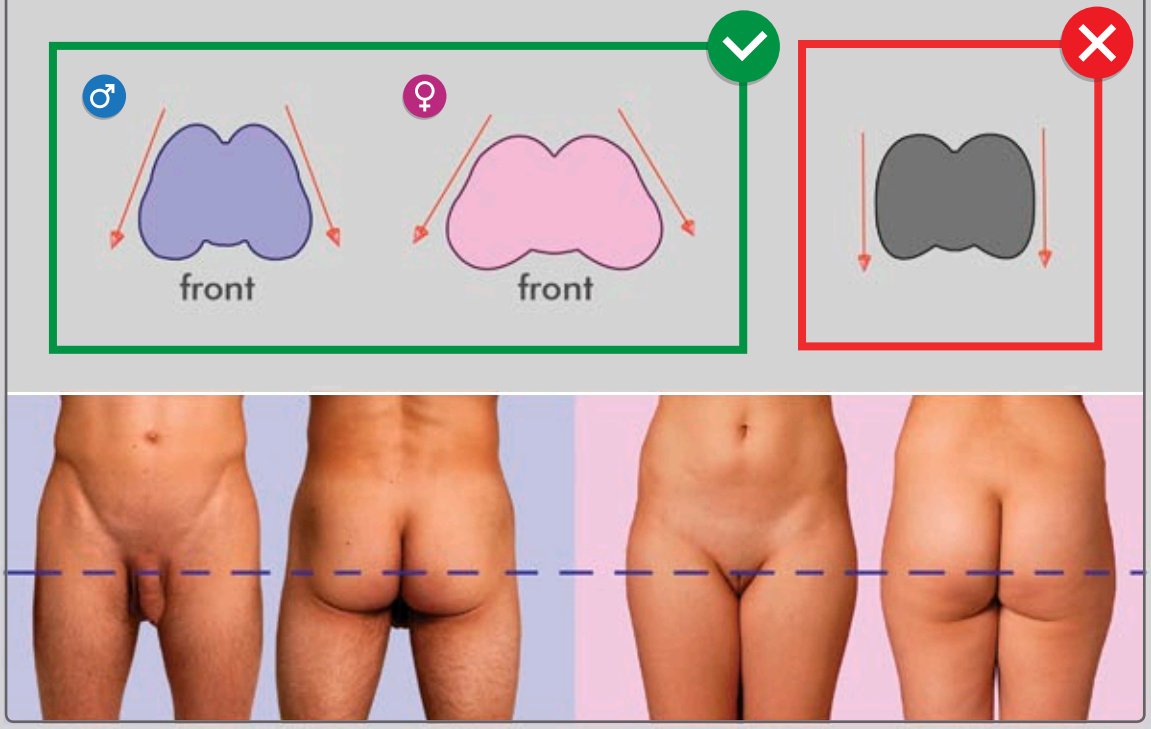
ALL ABOUT "BACKSIDES"



THE "RHOMBUS OF MICHAELIS" IS A FAT PAD
THAT IS SOMETIMES VISIBLE ON THE LOWER BACK OF FEMALES.



HORIZONTAL CROSS SECTIONS OF MALE AND FEMALE PELVIS.



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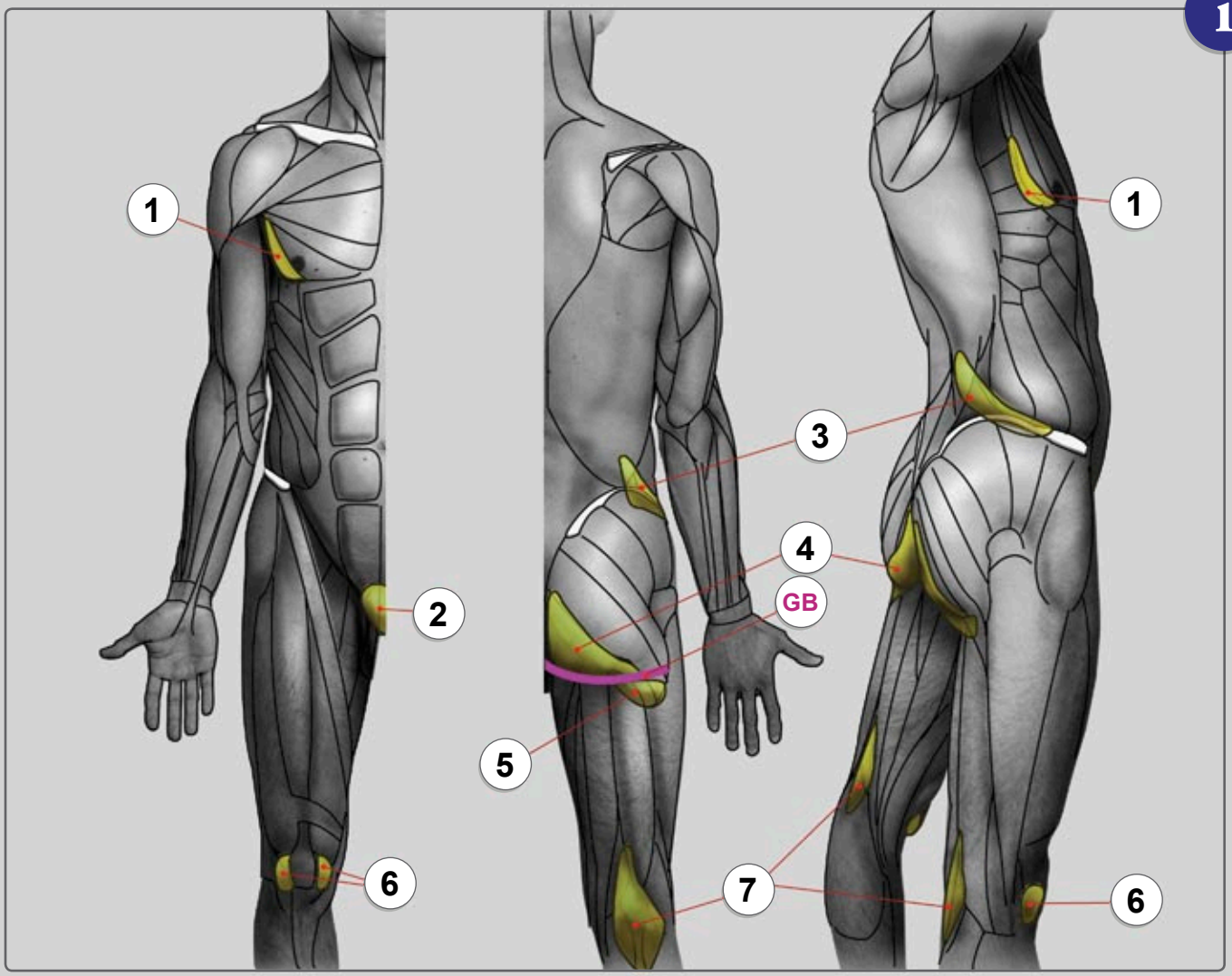
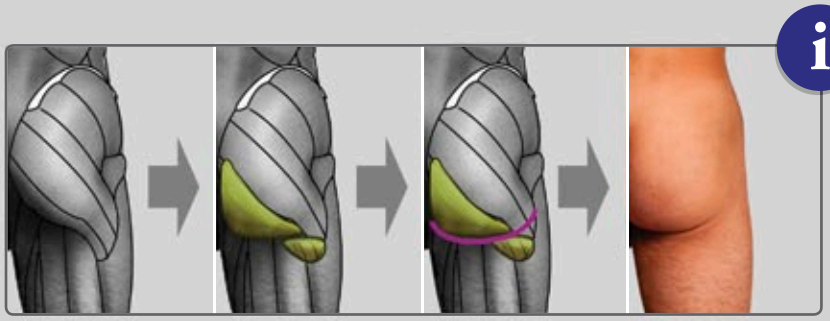
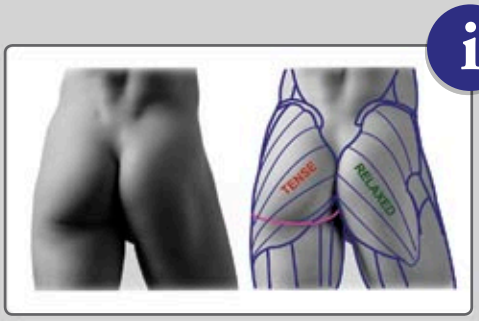
MALE SUBCUTANEOUS FAT PADS



1 PECTORAL FAT PAD	4 LATERAL GLUTEAL FAT PAD	7 POPLITEAL FAT PAD
2 PUBIC FAT PAD	5 INFERIOR GLUTEAL FAT EXTENSION	GB **GLUTEAL BAND** – CREATES SKIN FOLD. WHEN THE THIGH FLEXES, GLUTEAL FOLD DISAPPEARS.
3 FLANK FAT PAD	6 INFRAPATELLAR FAT PAD	





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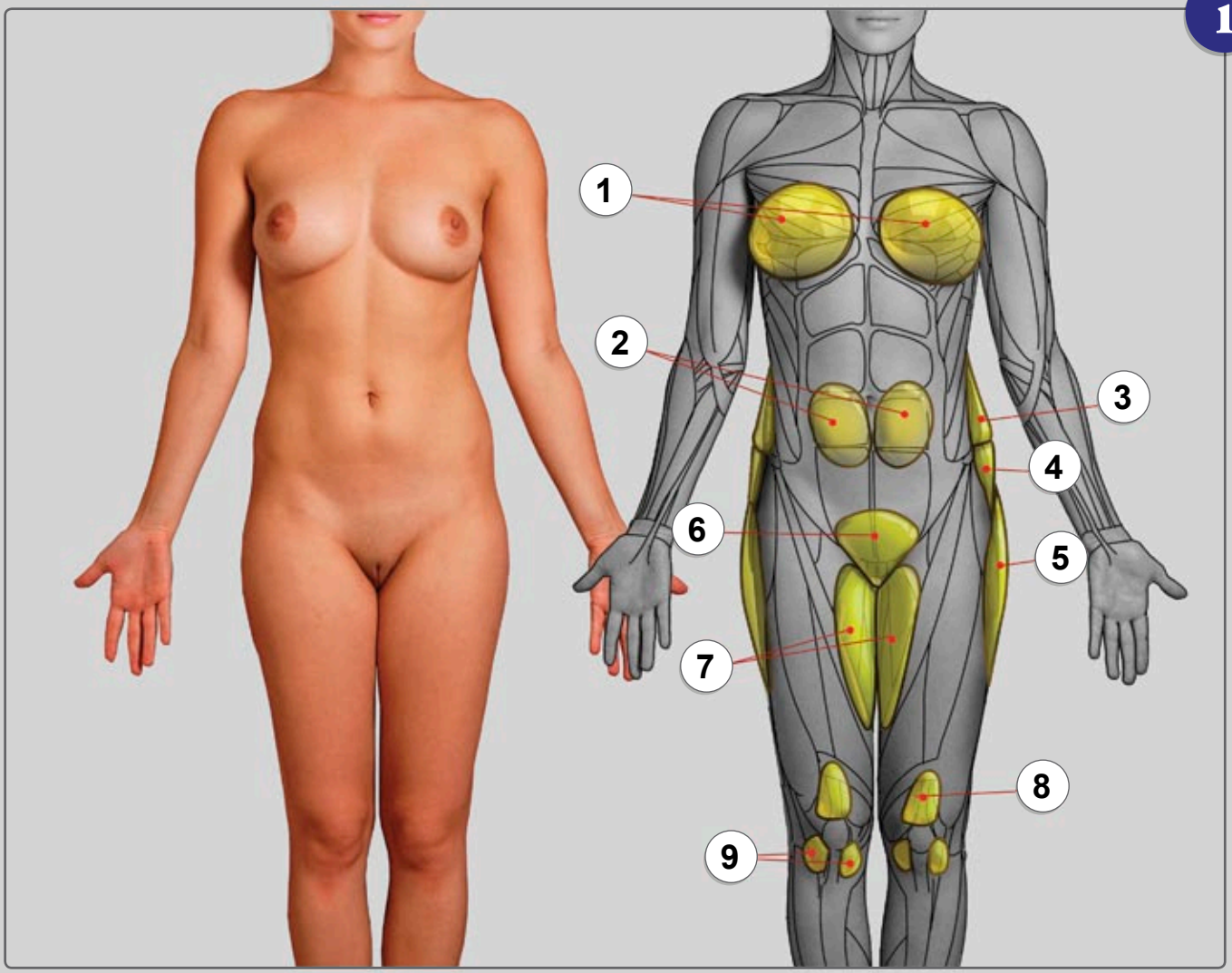
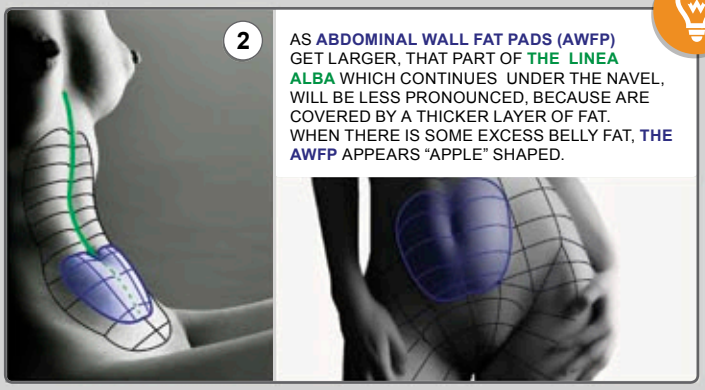
FEMALE SUBCUTANEOUS FAT PADS

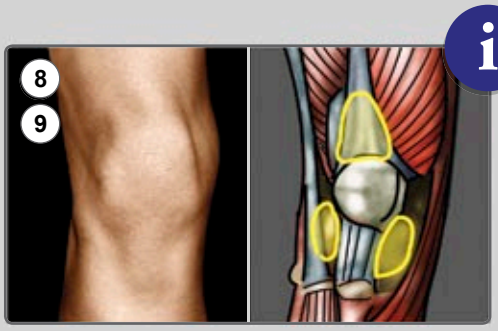
(FRONT VIEW)



1. BREAST FAT
2. ABDOMINAL WALL FAT PAD
3. FLANK FAT PAD
4. LATERAL GLUTEAL FAT PAD
5. OUTER THIGH FAT PAD
6. PUBIC FAT PAD
7. INNER THIGH FAT PAD
8. LOWER ANTERIOR THIGH FAT PAD
9. INFRAPATELLAR FAT PAD



AS **ABDOMINAL WALL FAT PADS (AWFP)** GET LARGER, THAT PART OF **THE LINEA ALBA** WHICH CONTINUES UNDER THE NAVEL, WILL BE LESS PRONOUNCED, BECAUSE ARE COVERED BY A THICKER LAYER OF FAT. WHEN THERE IS SOME EXCESS BELLY FAT, **THE AWFP** APPEARS "APPLE" SHAPED.



RIGHT KNEE

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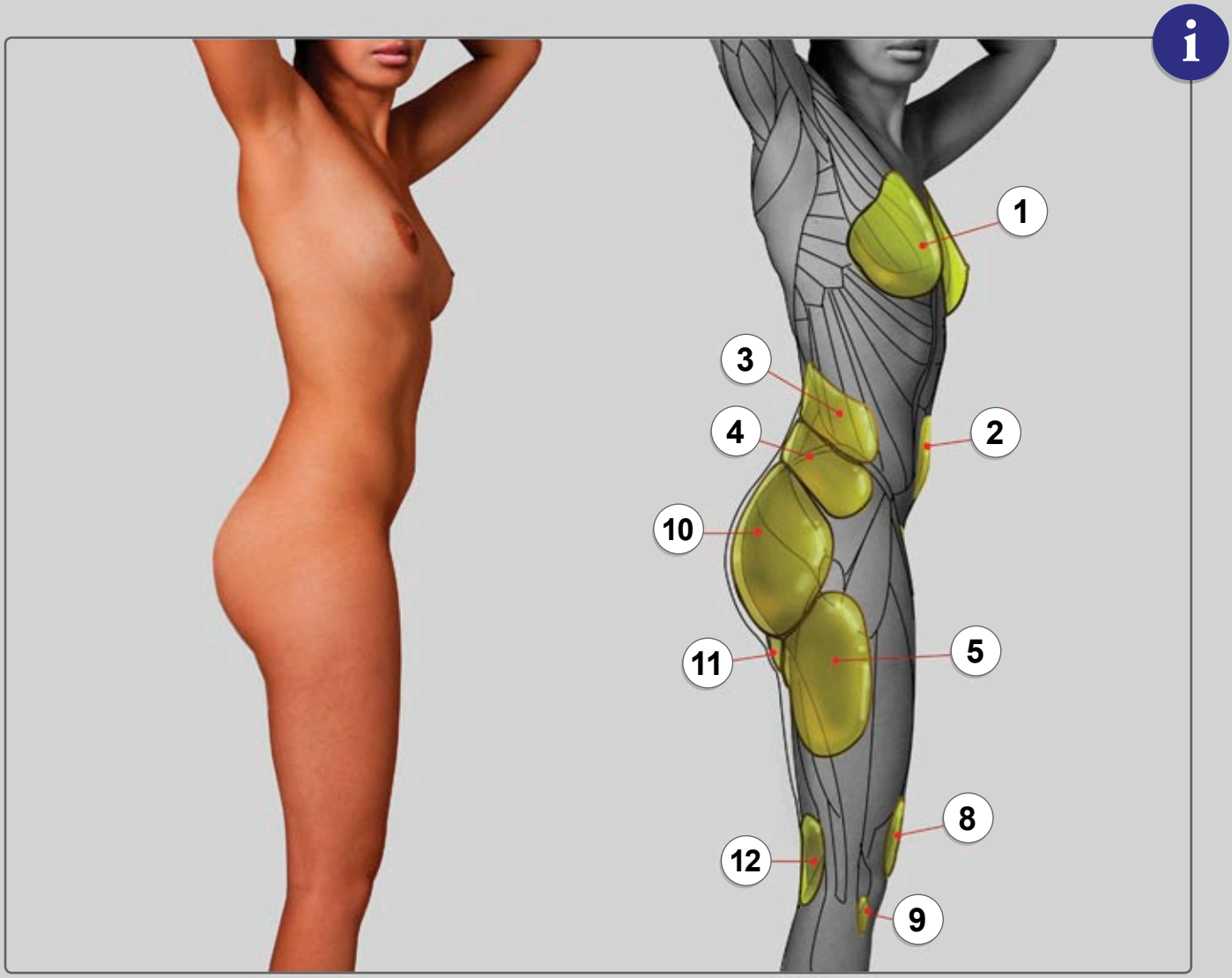
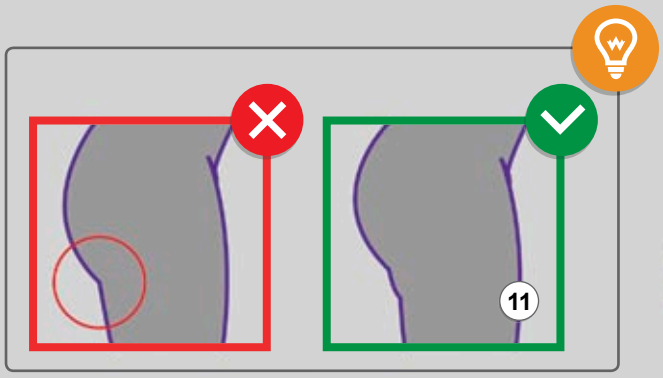
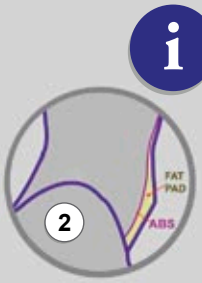
FEMALE SUBCUTANEOUS FAT PADS

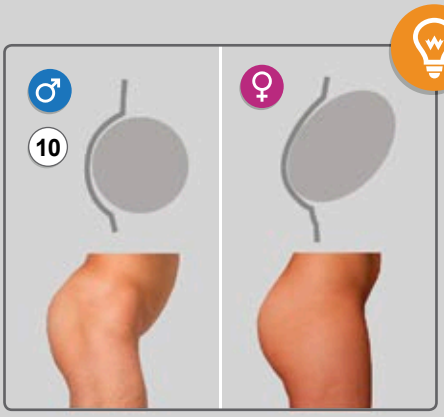
(SIDE VIEW)



1 BREAST FAT	5 OUTER THIGH FAT PAD	11 INFERIOR GLUTEAL FAT EXTENSION
2 ABDOMINAL FAT PAD	8 LOWER ANTERIOR THIGH FAT PAD	
3 FLANK FAT PAD	9 INFRAPATELLAR FAT PAD	12 POPLITEAL FAT PAD
4 LATERAL GLUTEAL FAT PAD	10 POSTERIOR GLUTEAL FAT PAD	







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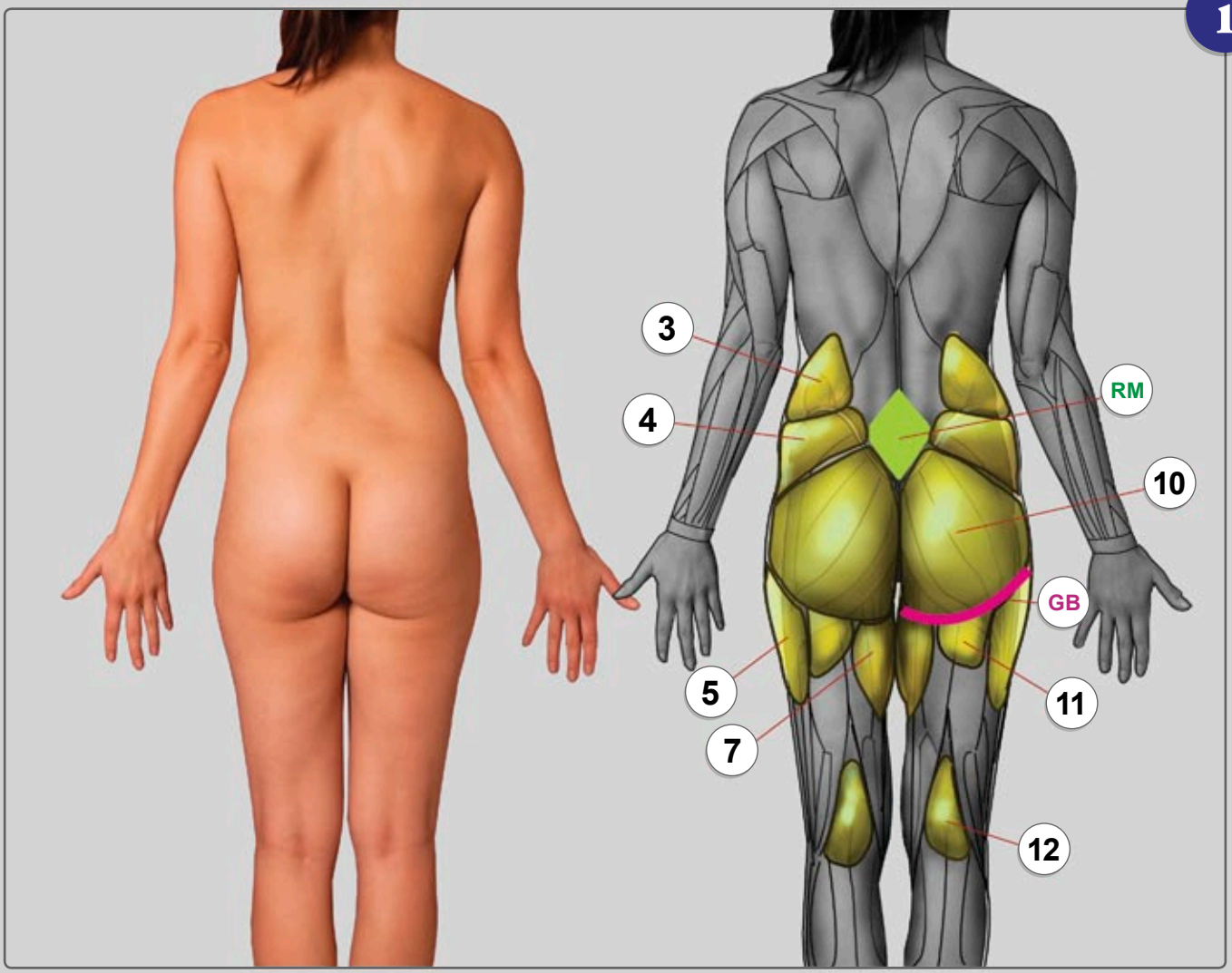
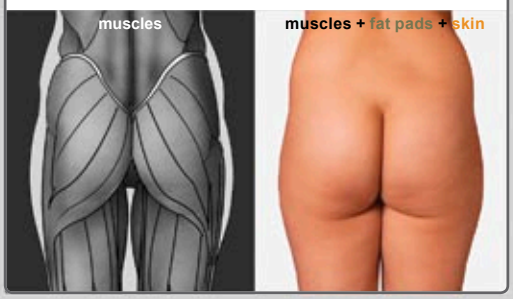
FEMALE SUBCUTANEOUS FAD PADS

(BACK VIEW)



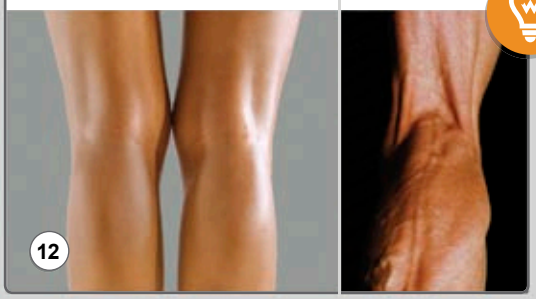
3 FLANK FAT PAD	5 OUTER THIGH FAT PAD	10 POSTERIOR GLUTEAL FAT PAD
4 LATERAL GLUTEAL FAT PAD	7 INNER THIGH FAT PAD	11 INFERIOR GLUTEAL FAT EXTENSION
12 POPLITEAL FAT PAD	RM **"RHOMBUS OF MICHAELIS"**	GB **GLUTEAL BAND** – CREATES SKIN FOLD. WHEN THE THIGH IS FLEXED, GLUTEAL FOLD DISAPPEARS

FEMALES HAVE MORE AND MUCH THICKER SUBCUTANEOUS FAT PADS THAN MALES. THIS IS WHY "TYPICAL FEMALE CURVES" APPEAR.



WHEN THE LEG IS STRAIGHT, POPLITEAL FAT PAD POPS OUT!

EXTREMELY FATLESS (DRY) BODY CASE.



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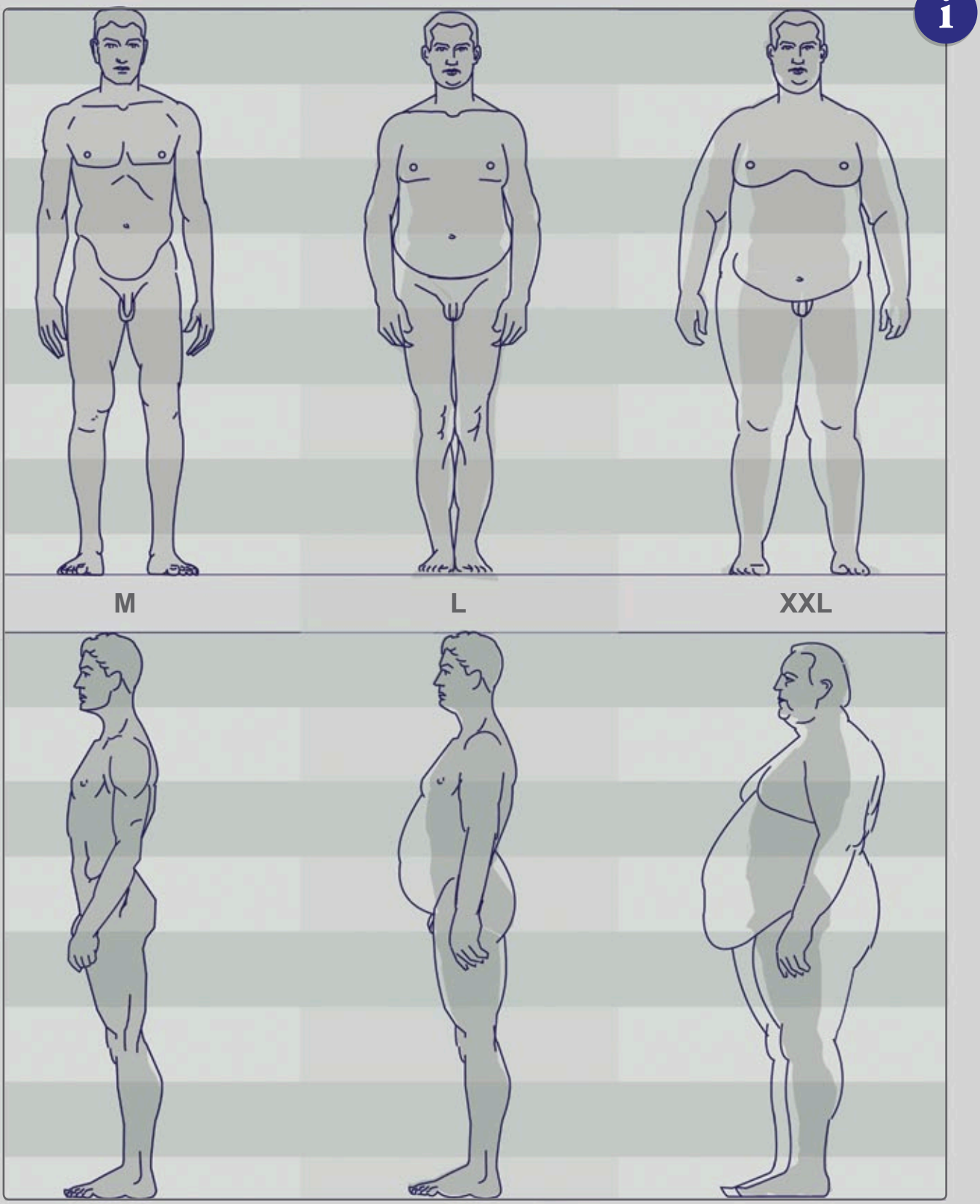
PROPORTIONAL CHANGES OF AN OBESE MALE: 7.5 HEAD UNITS



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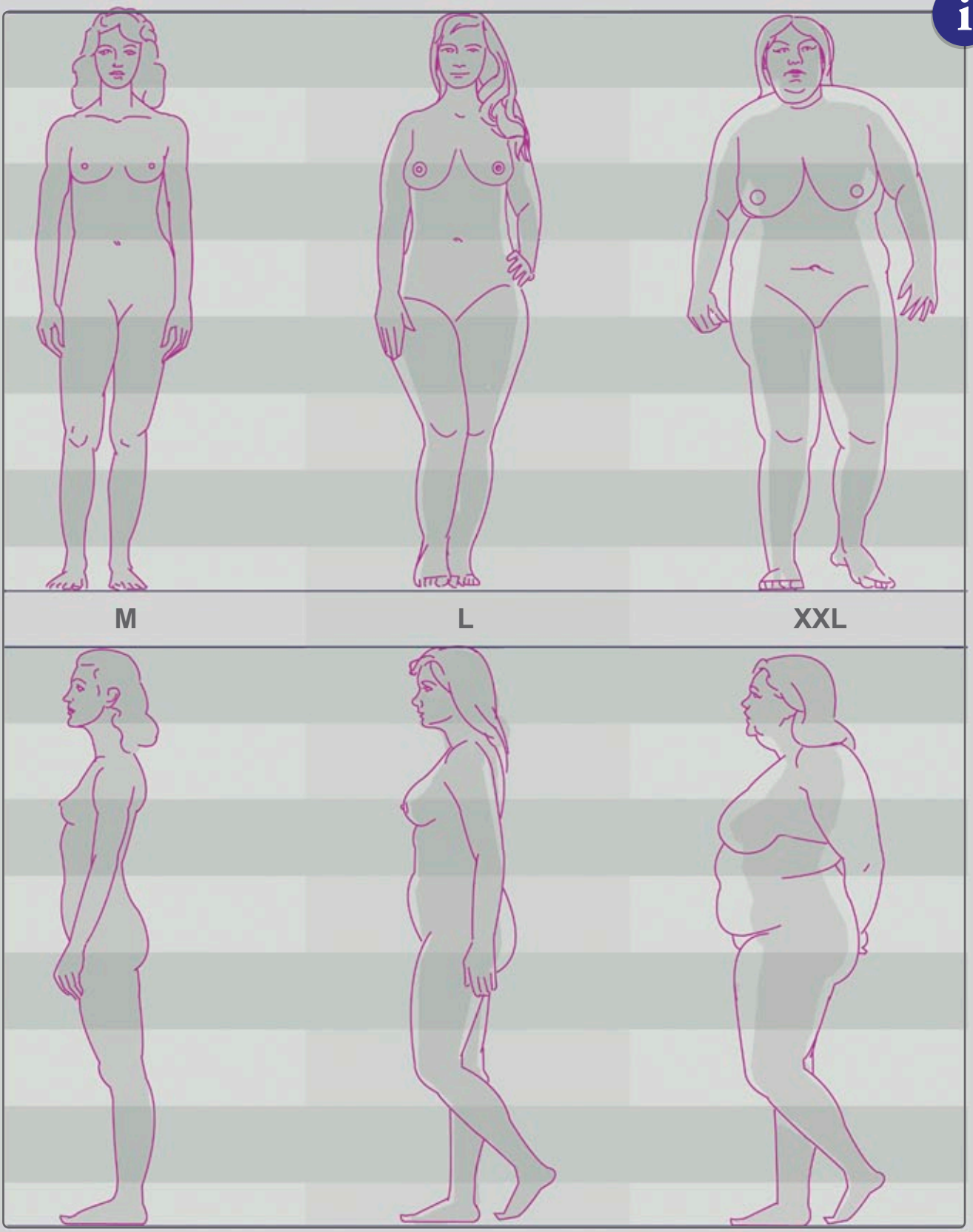
PROPORTIONAL CHANGES OF AN OBESE FEMALE: 7.5 HEAD UNITS



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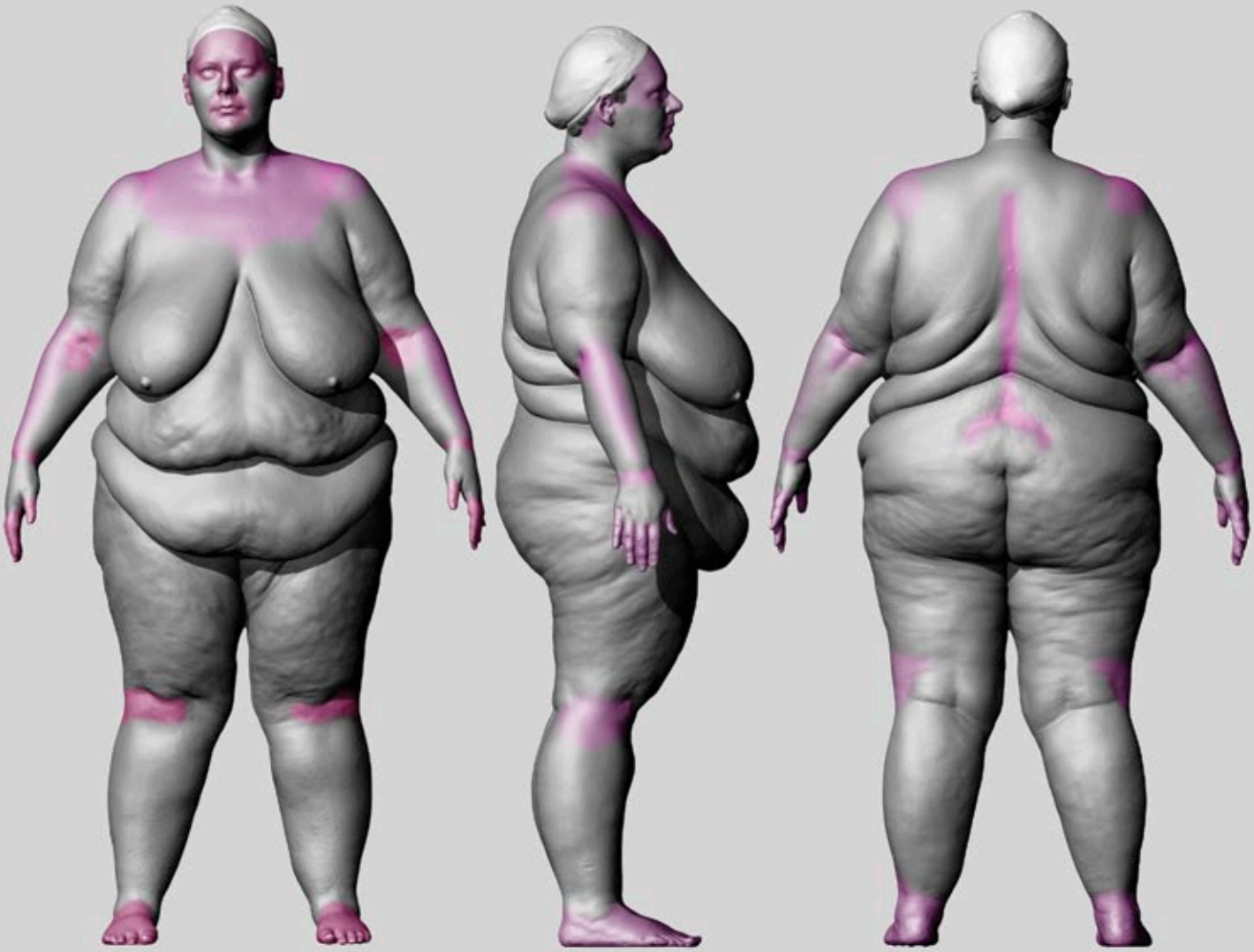
AREAS OF THE BODY THAT ARE LESS AFFECTED BY FAT ACCUMULATION



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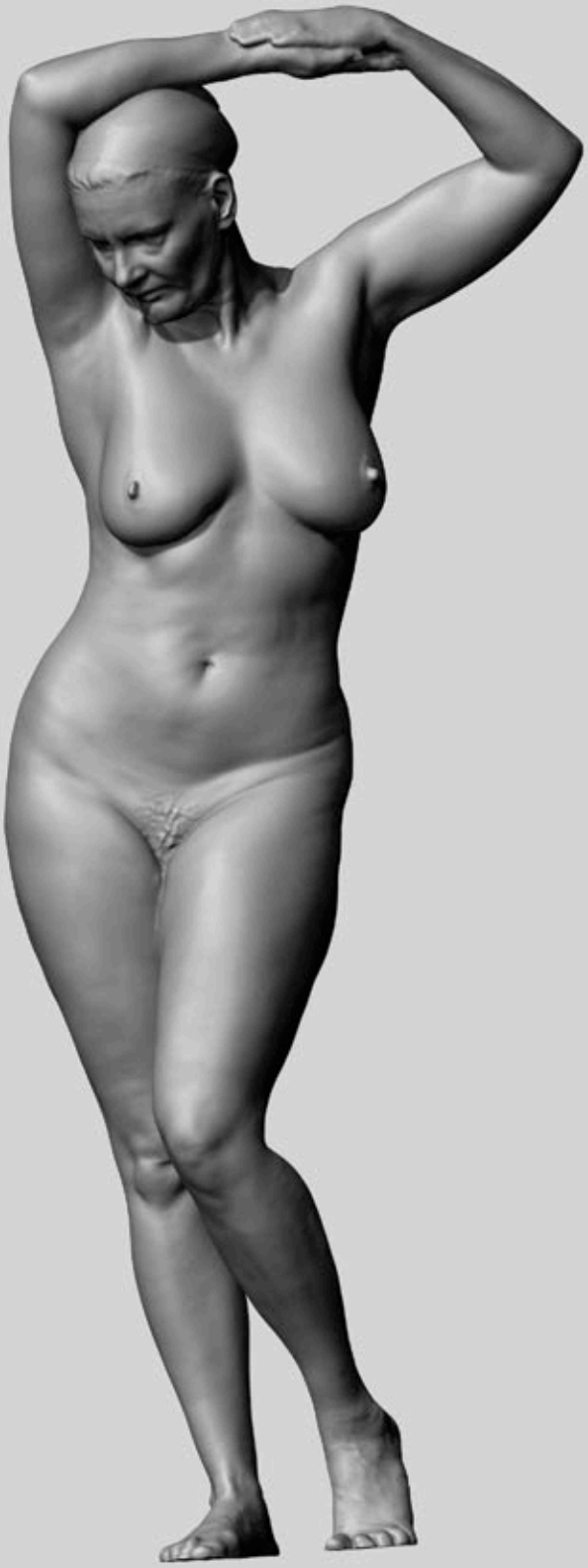
3D SCAN OF MIDDLE-AGED WOMAN



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3D SCAN OF YOUNG FEMALE

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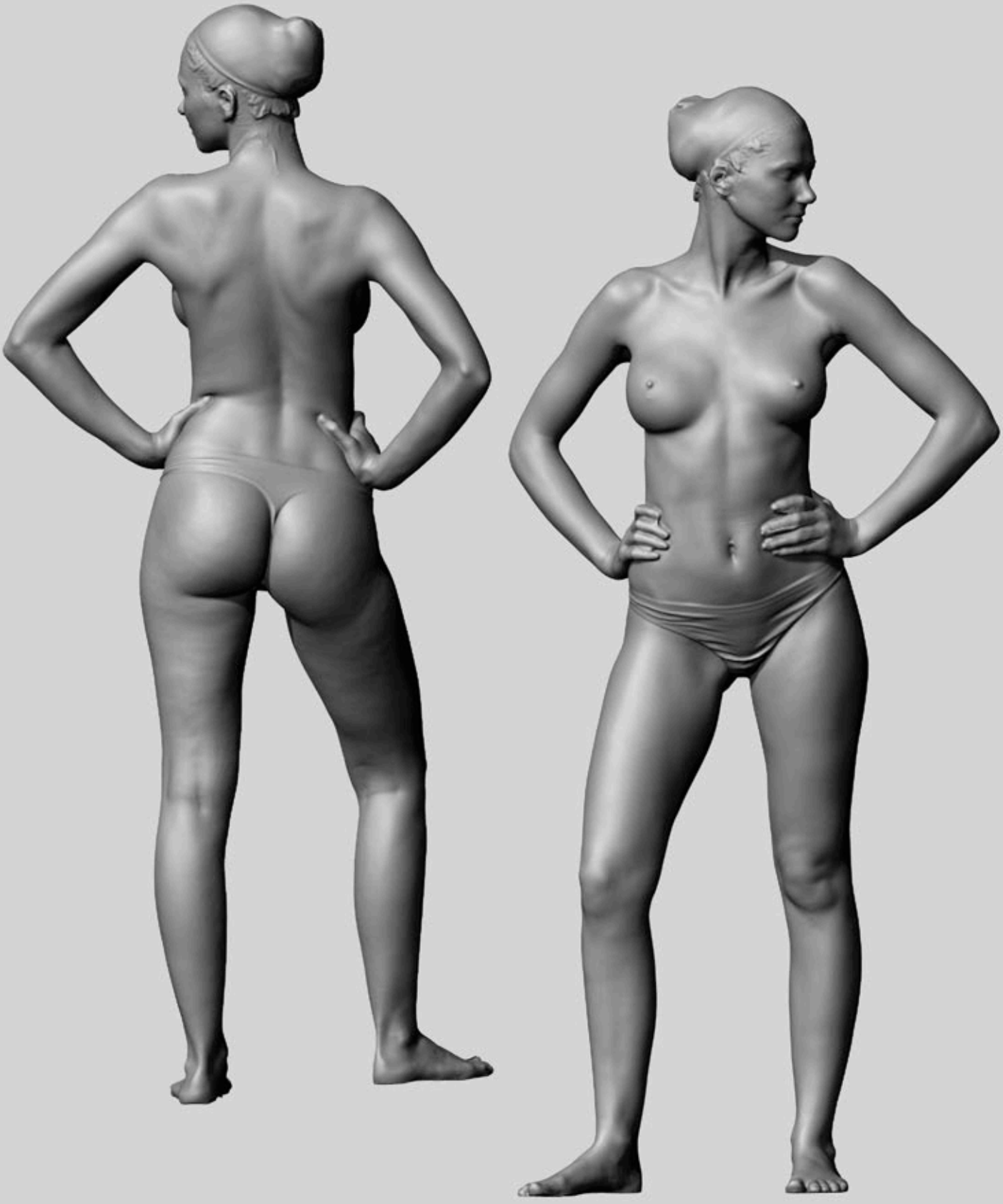
3D SCAN OF YOUNG FEMALE



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3D SCAN OF YOUNG MAN

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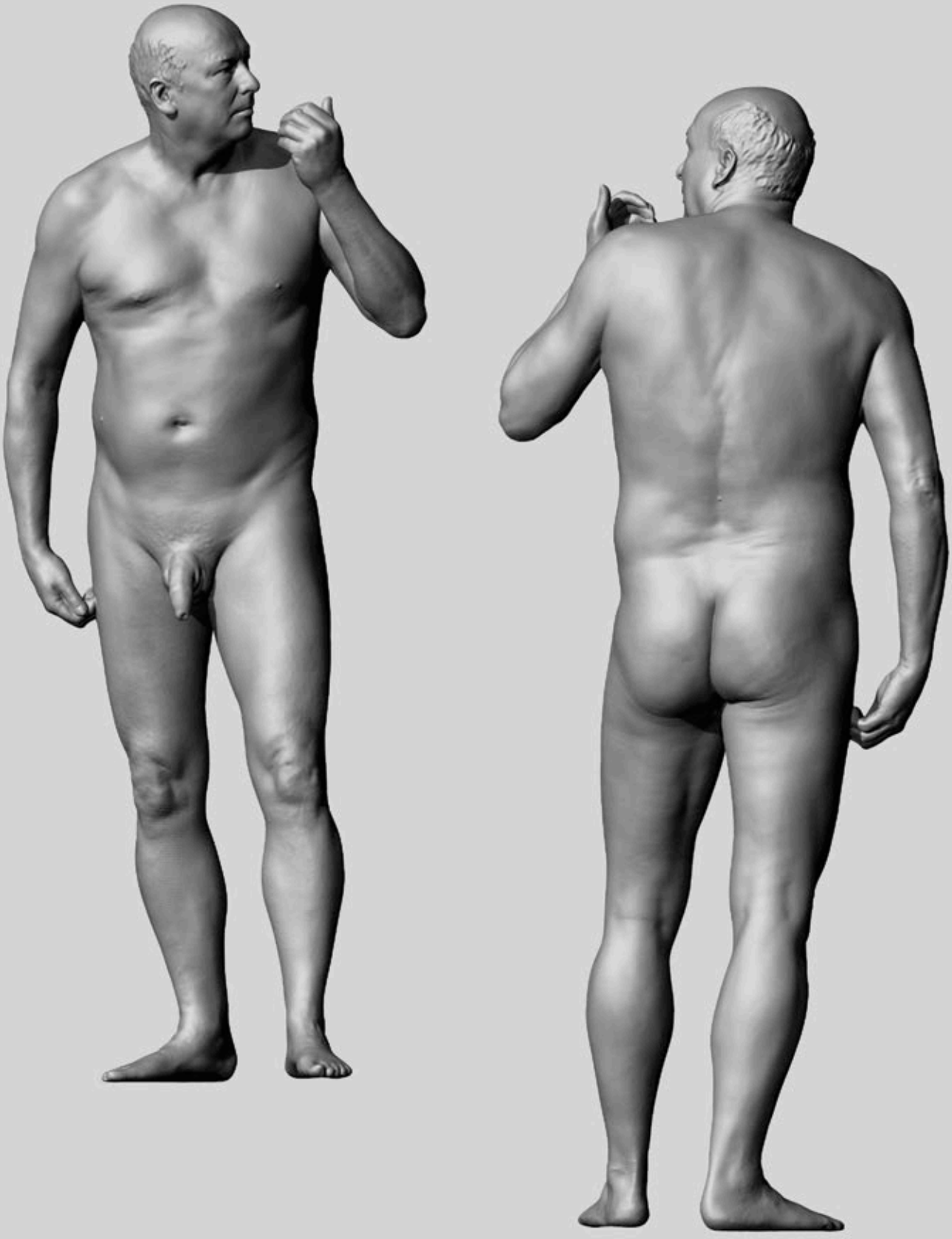
3D SCAN OF MIDDLE-AGED MAN



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ARMS REACHING BEHIND BODY

3/4

RIGHT SIDE

3/4

FRONT

BACK

LEFT SIDE

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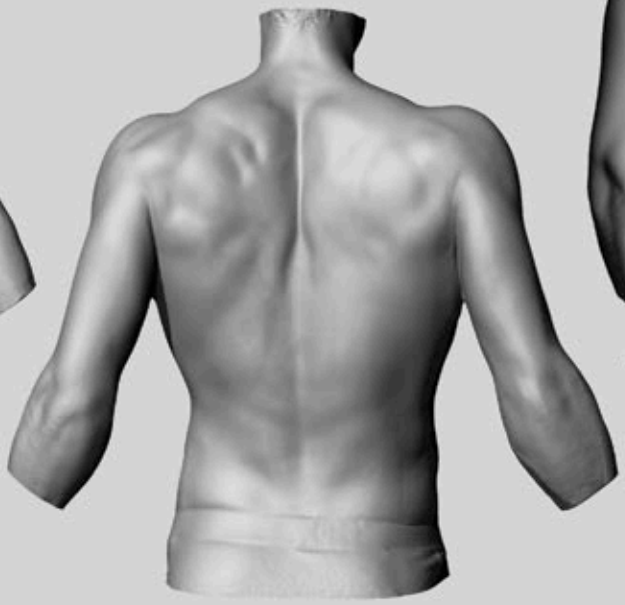
ARMS AT SIDES

3/4

LEFT SIDE

3/4

FRONT



BACK

RIGHT SIDE

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ARMS HELD STRAIGHT OUT TO SIDES

3/4

LEFT SIDE

3/4

FRONT

BACK

RIGHT SIDE

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ARMS IN A “Y” POSITION

3/4

LEFT SIDE

3/4

FRONT

BACK

RIGHT SIDE

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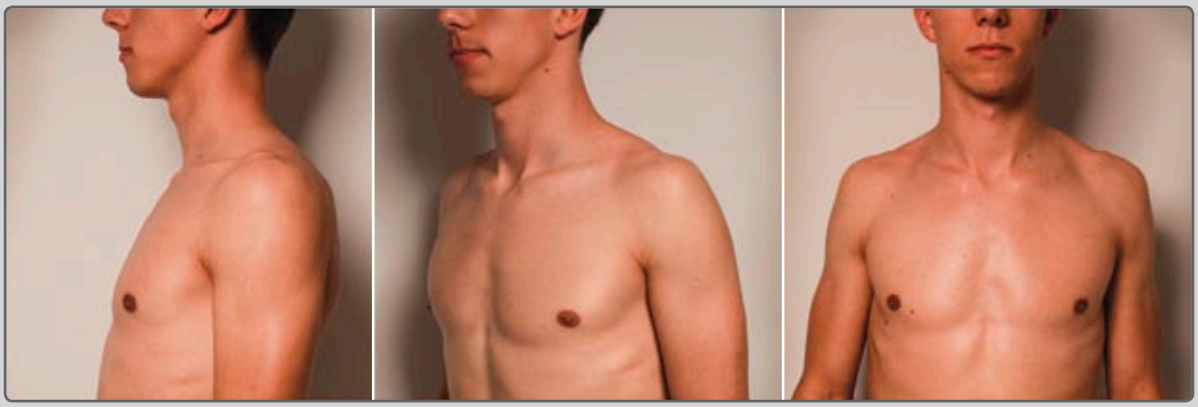
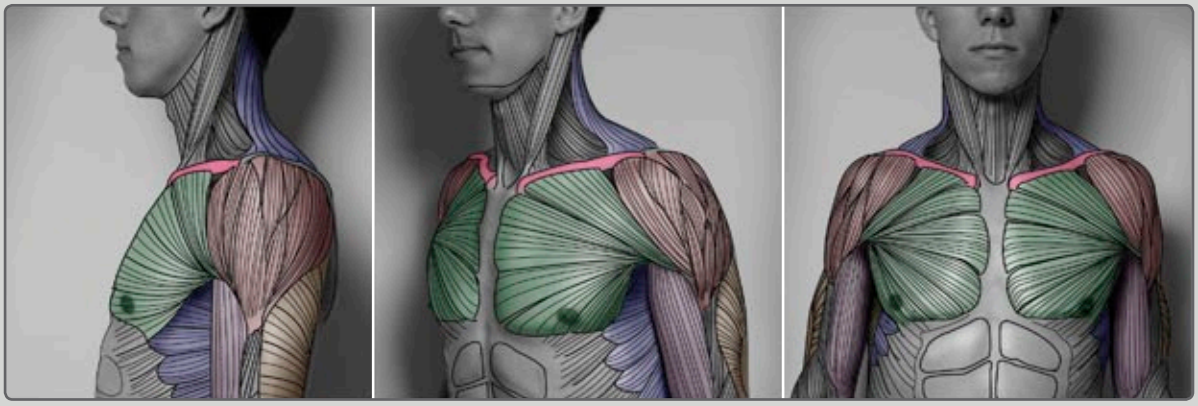
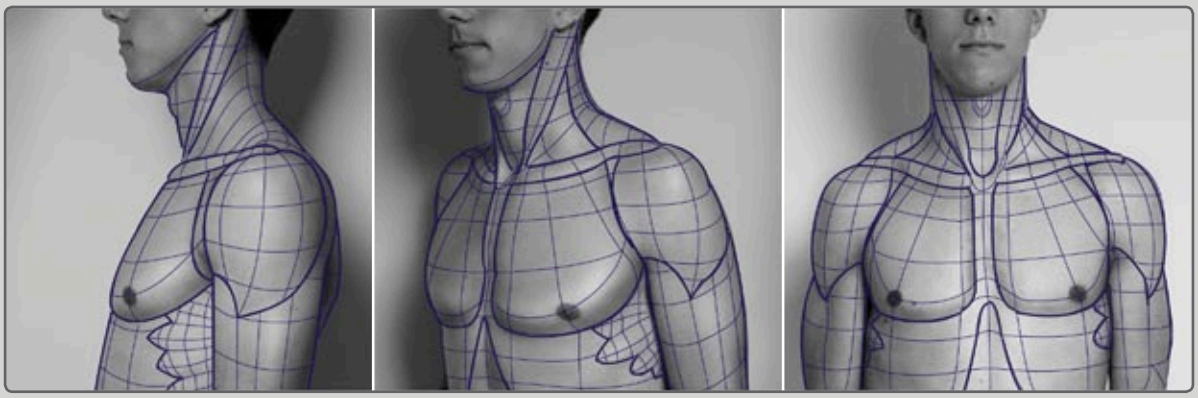
ARMS HANGING NATURALLY – MALE







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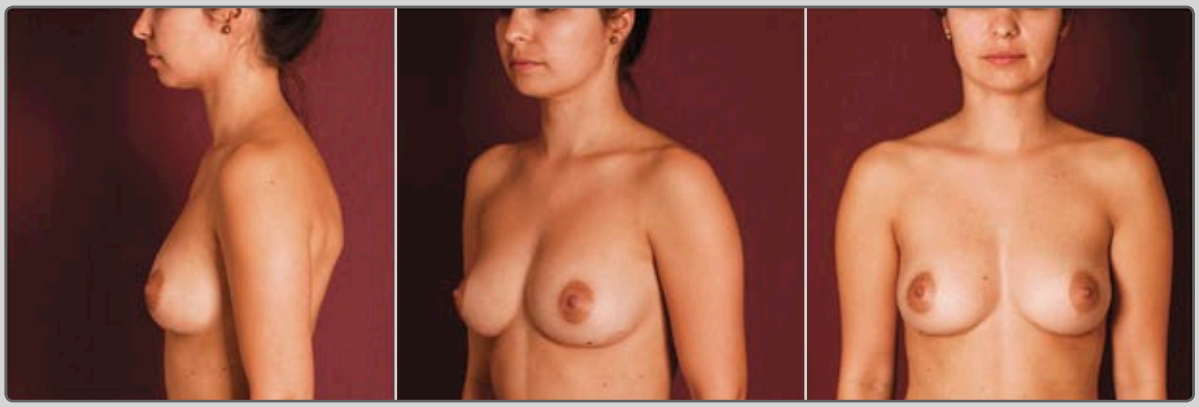
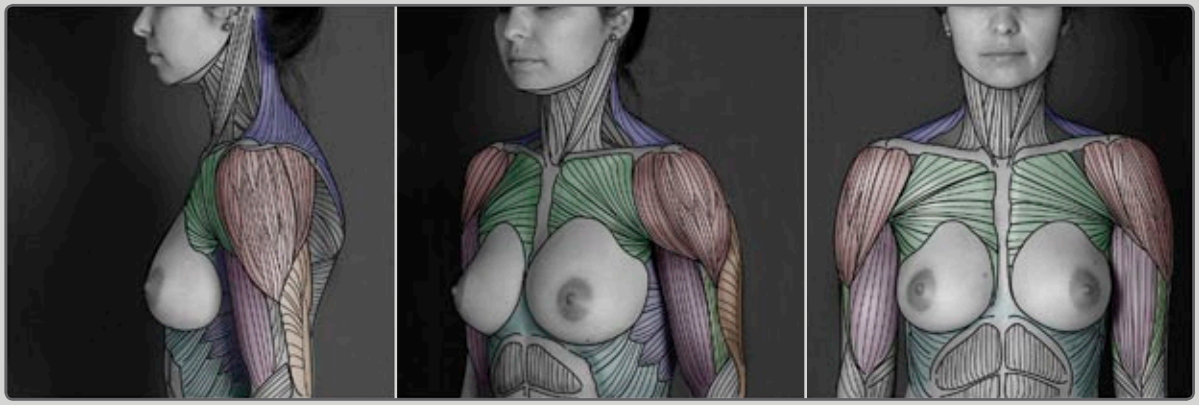
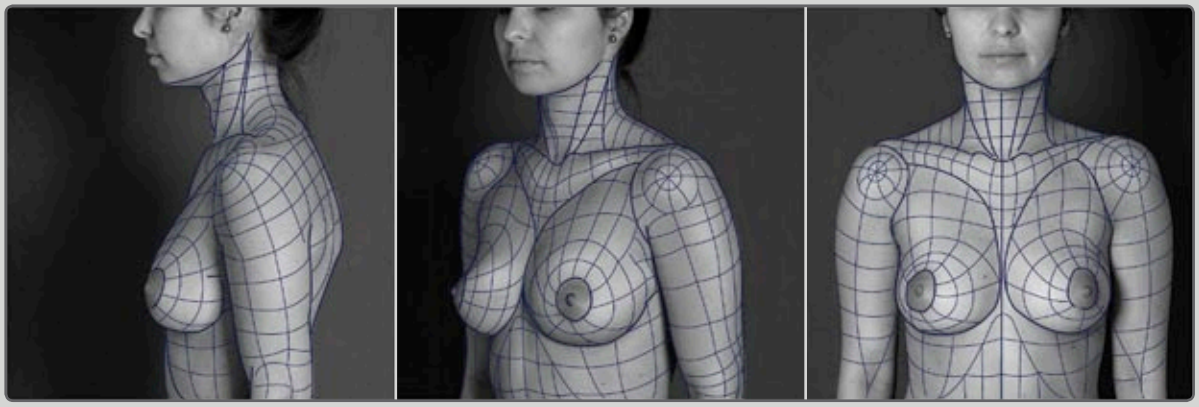
ARMS HANGING NATURALLY – FEMALE







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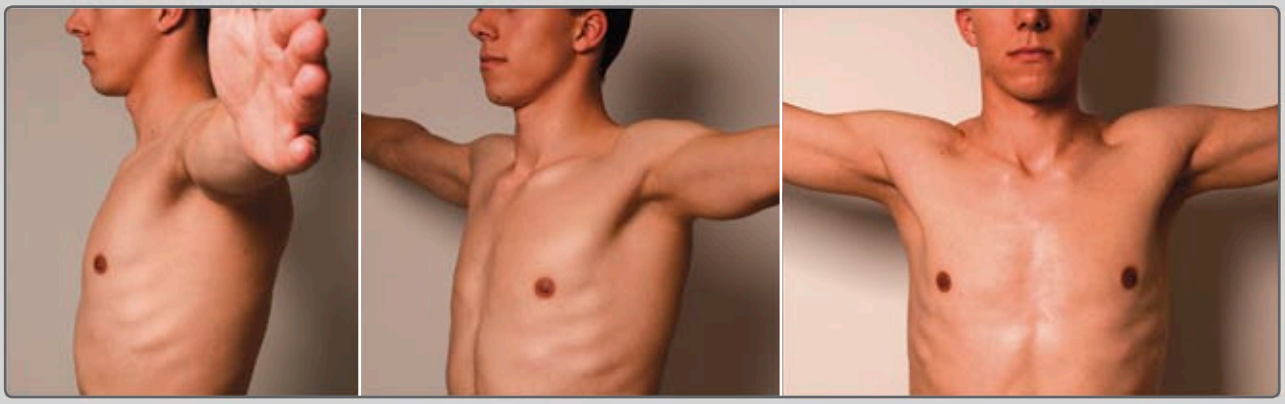
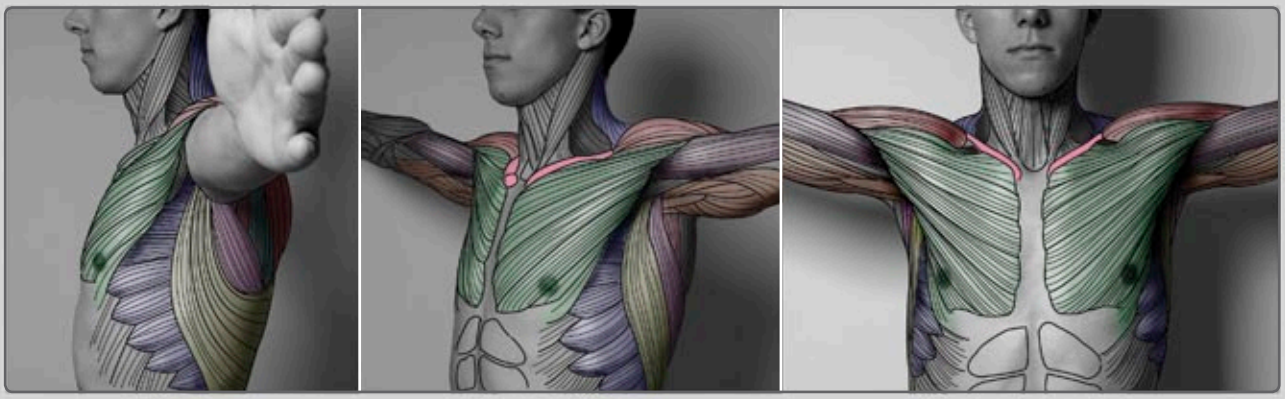
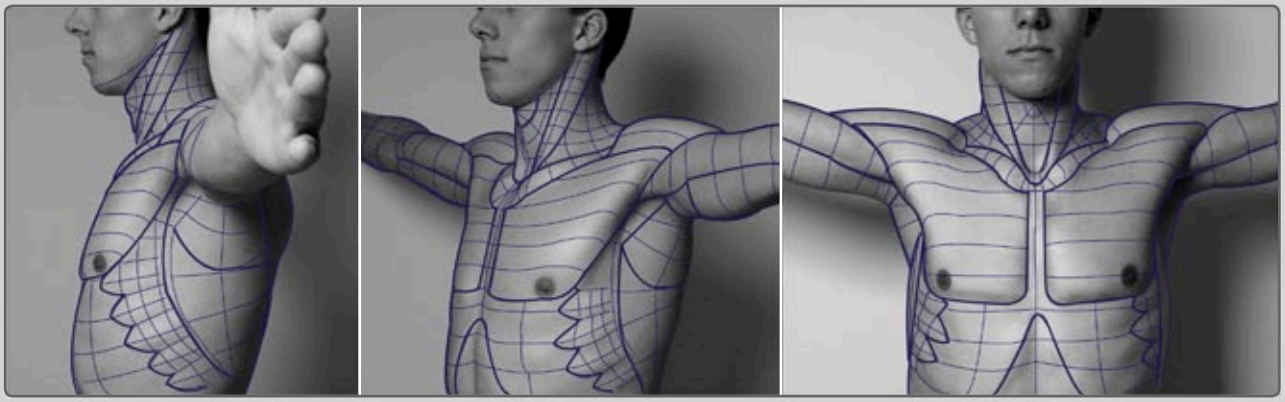
ARMS HELD STRAIGHT OUT TO SIDES – MALE







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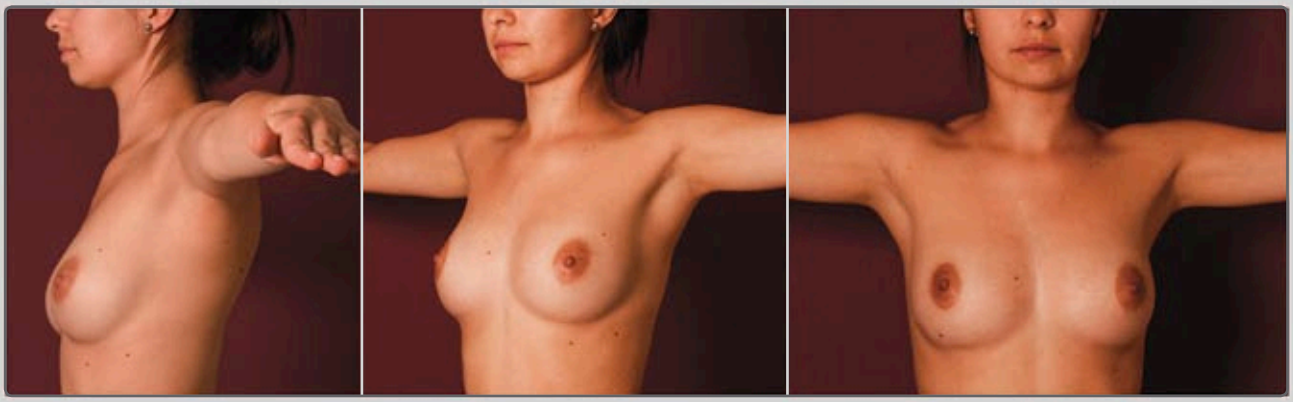
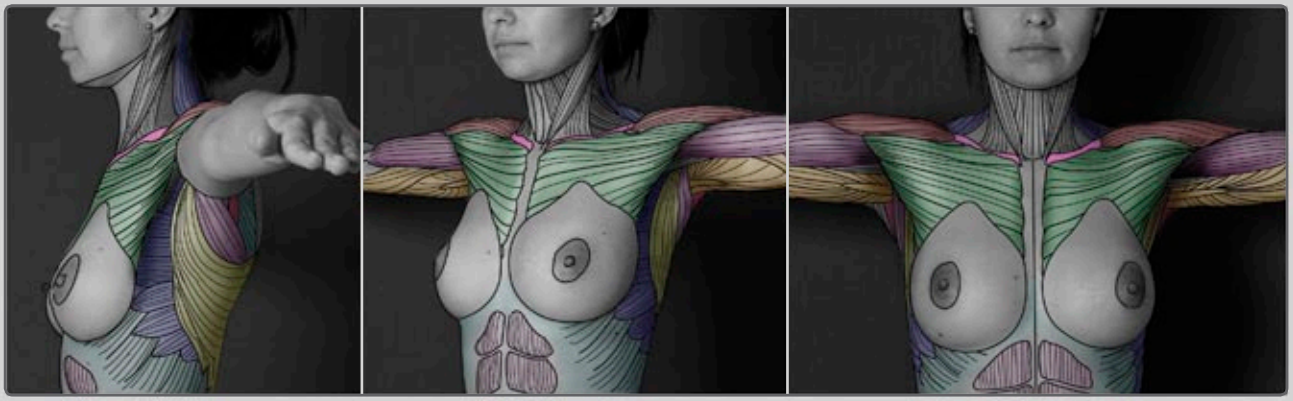
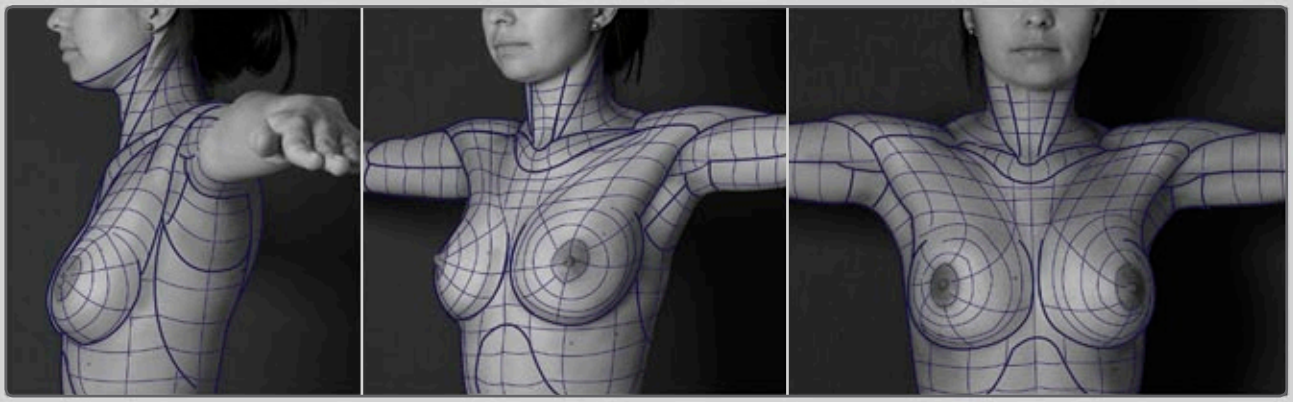
ARMS HELD STRAIGHT OUT TO SIDES – FEMALE







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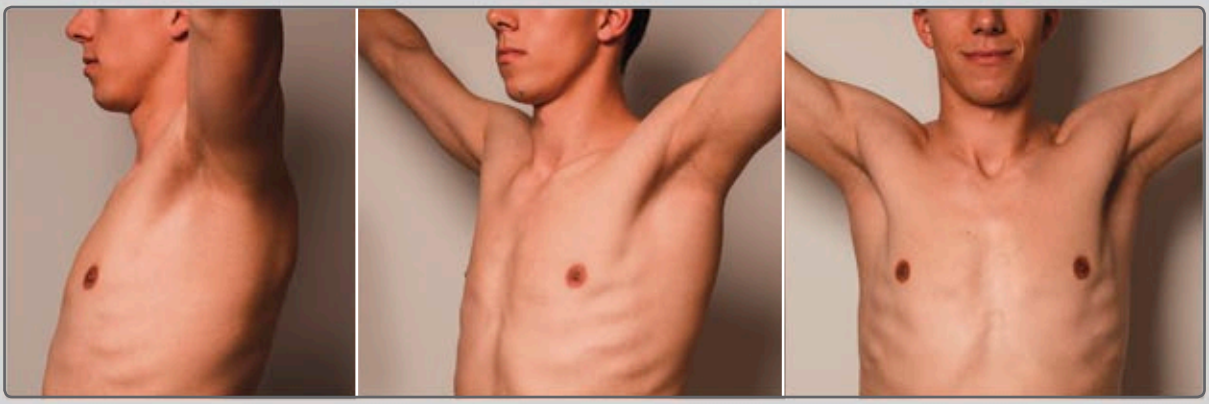
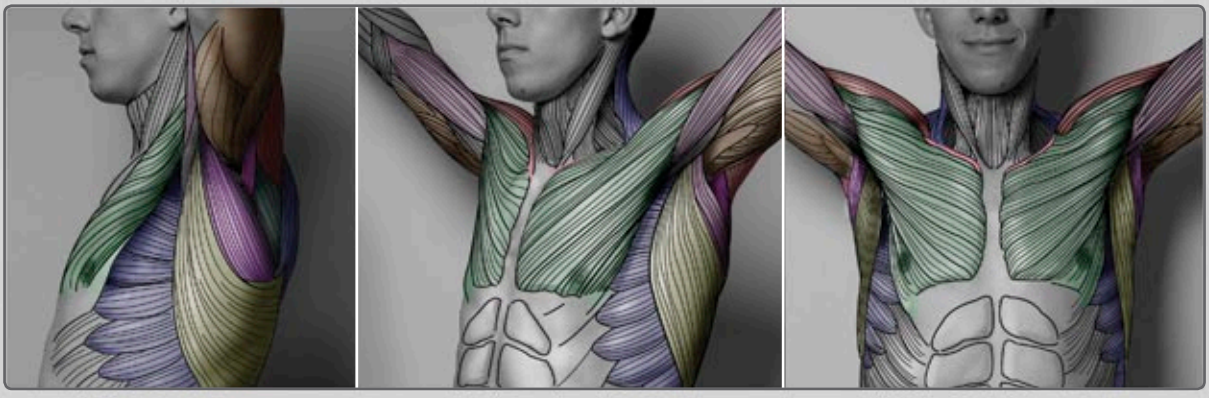
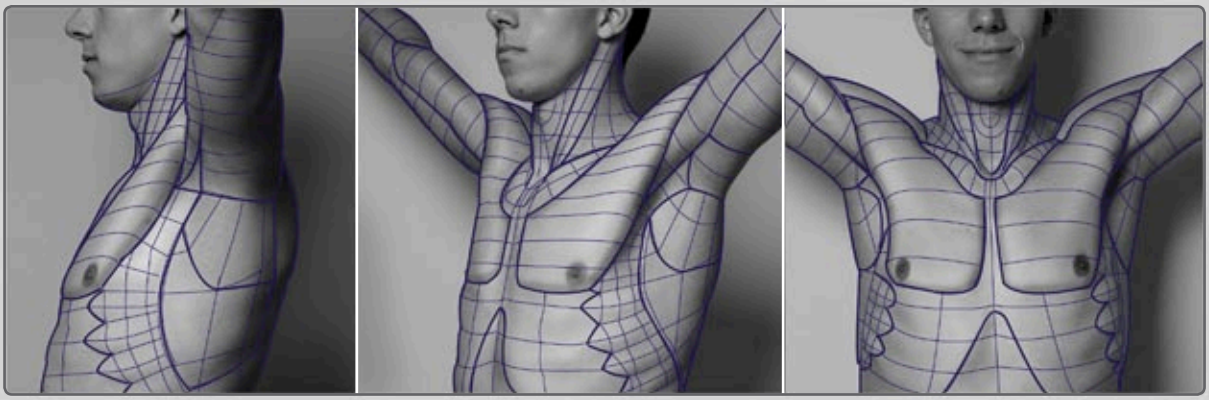
ARMS IN A “Y” POSITION – MALE







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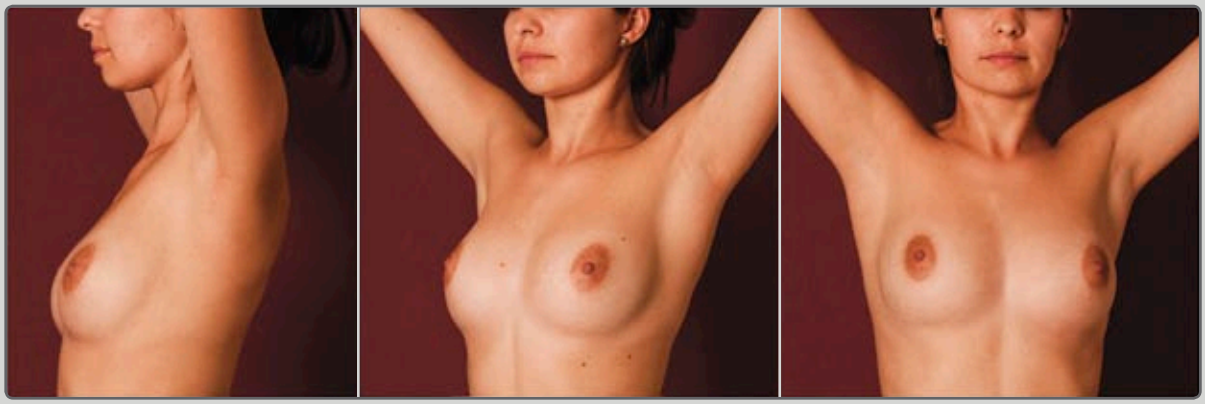
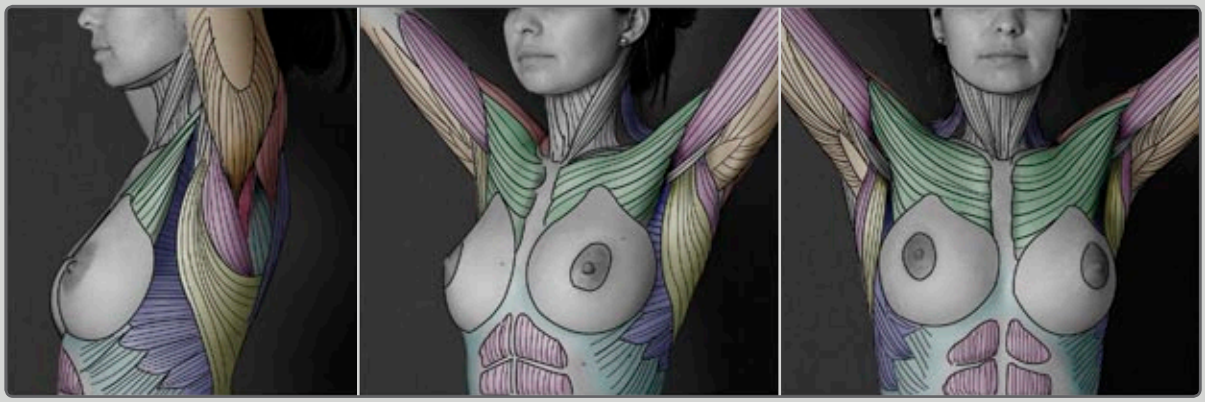
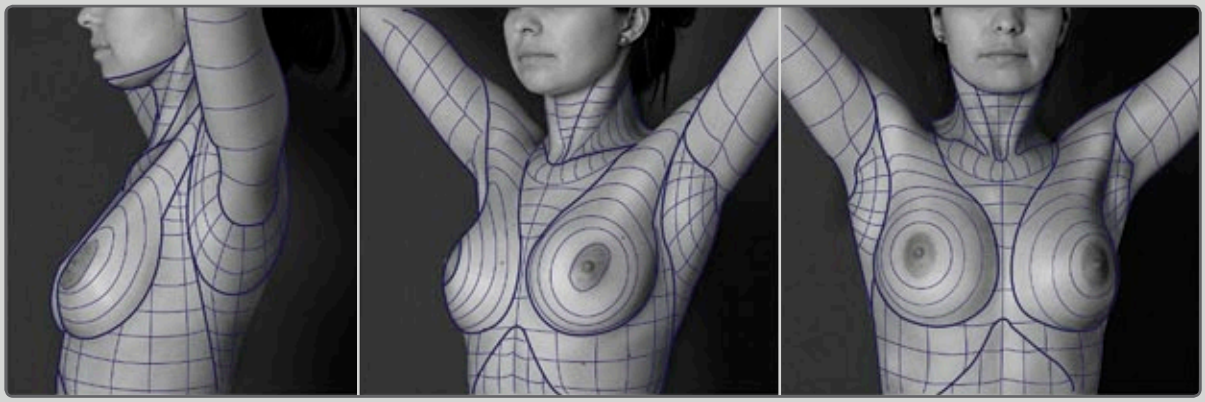
ARMS IN A “Y” POSITION – FEMALE







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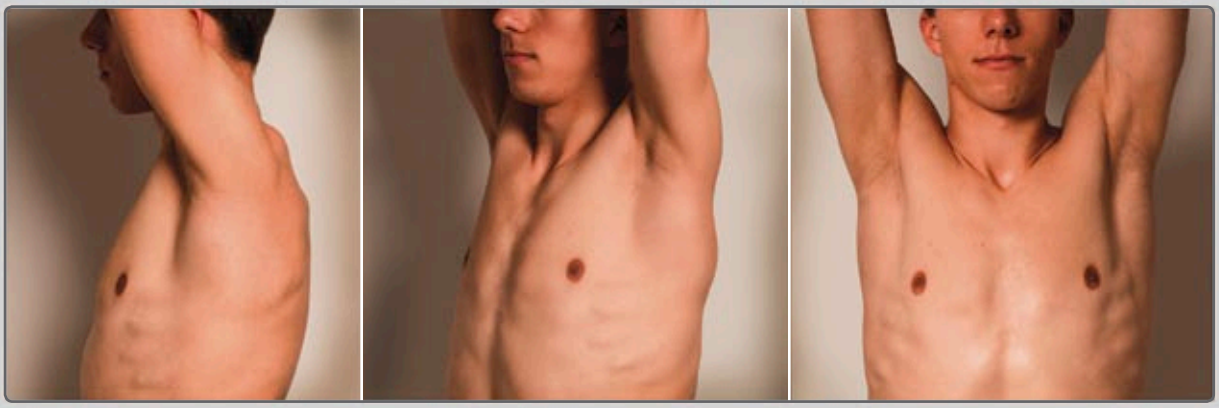
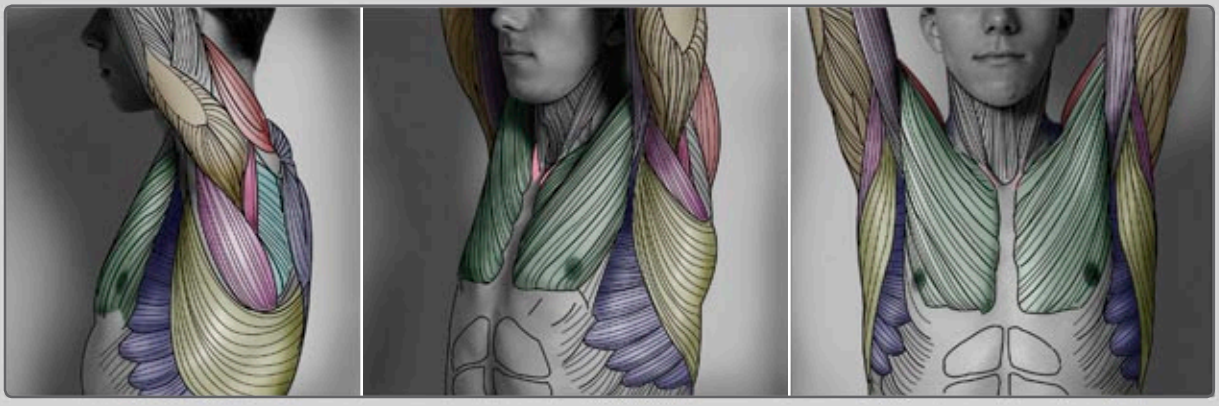
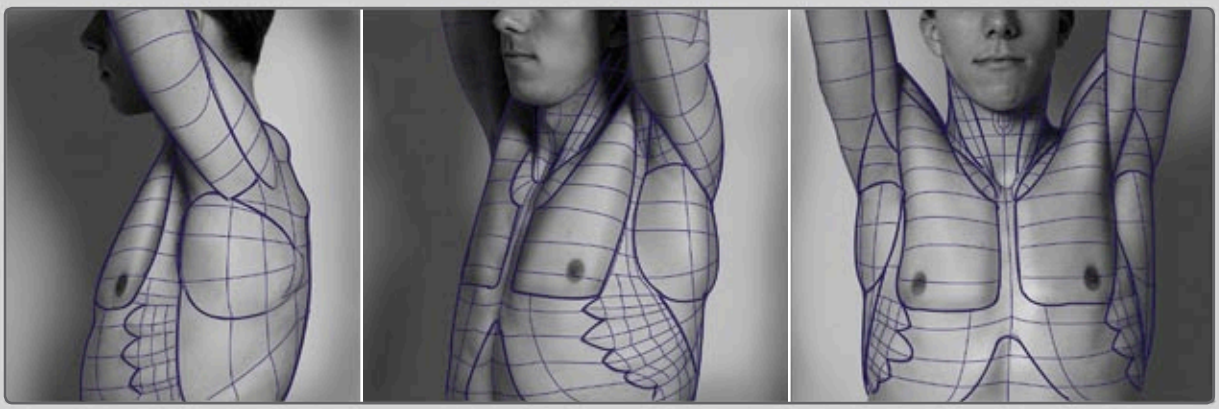
ARMS STRAIGHT UP – MALE







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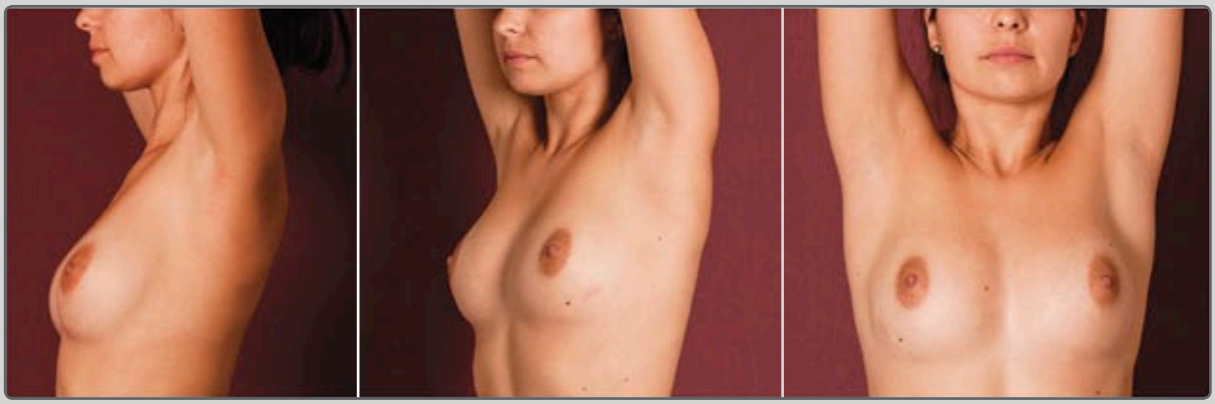
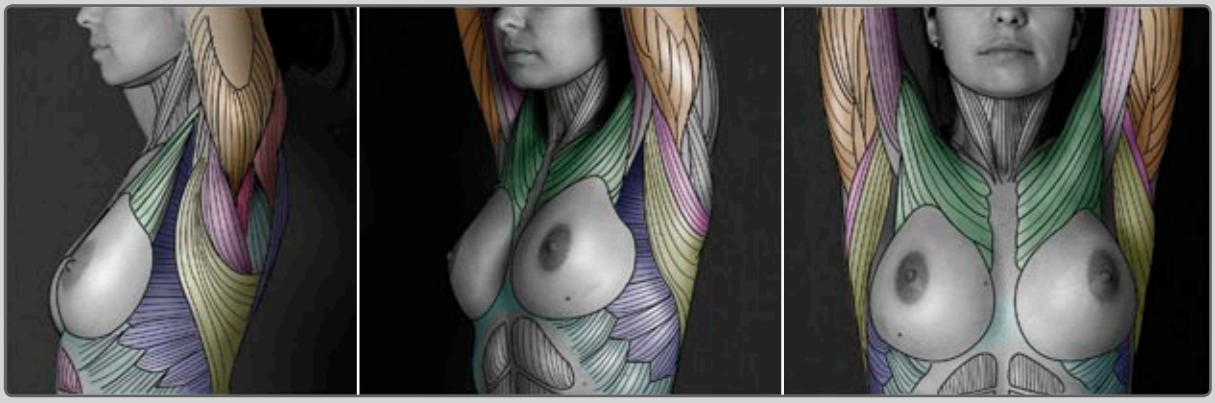
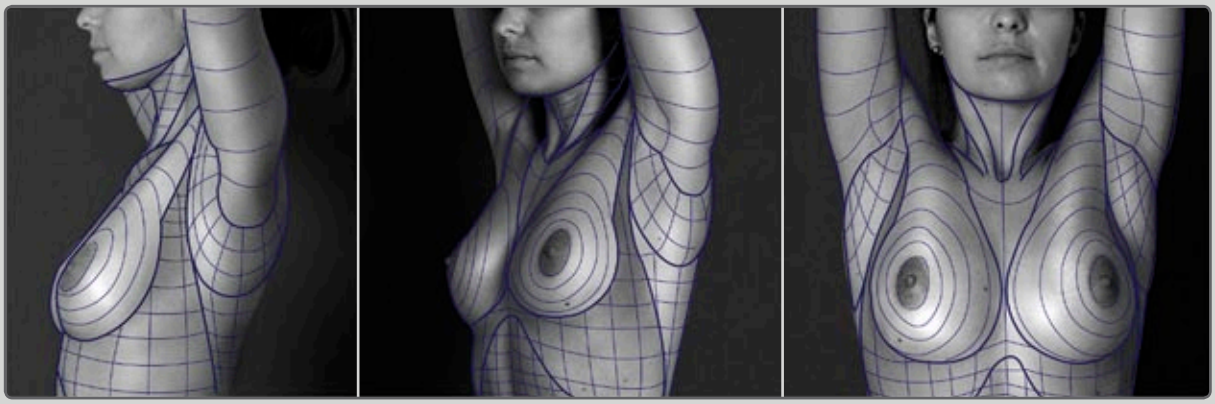
ARMS STRAIGHT UP – FEMALE







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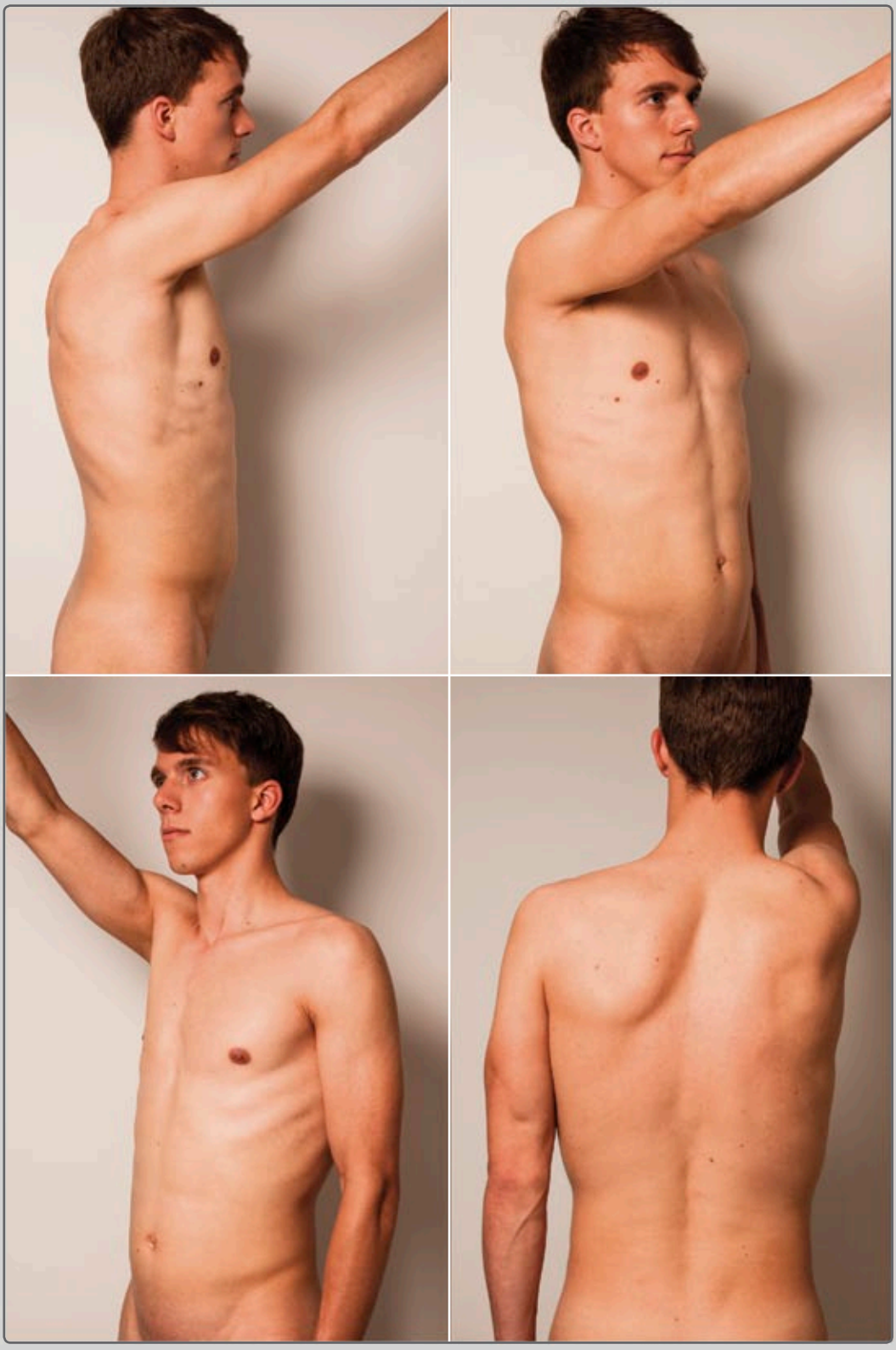
ARM REACHING UP AND FORWARD



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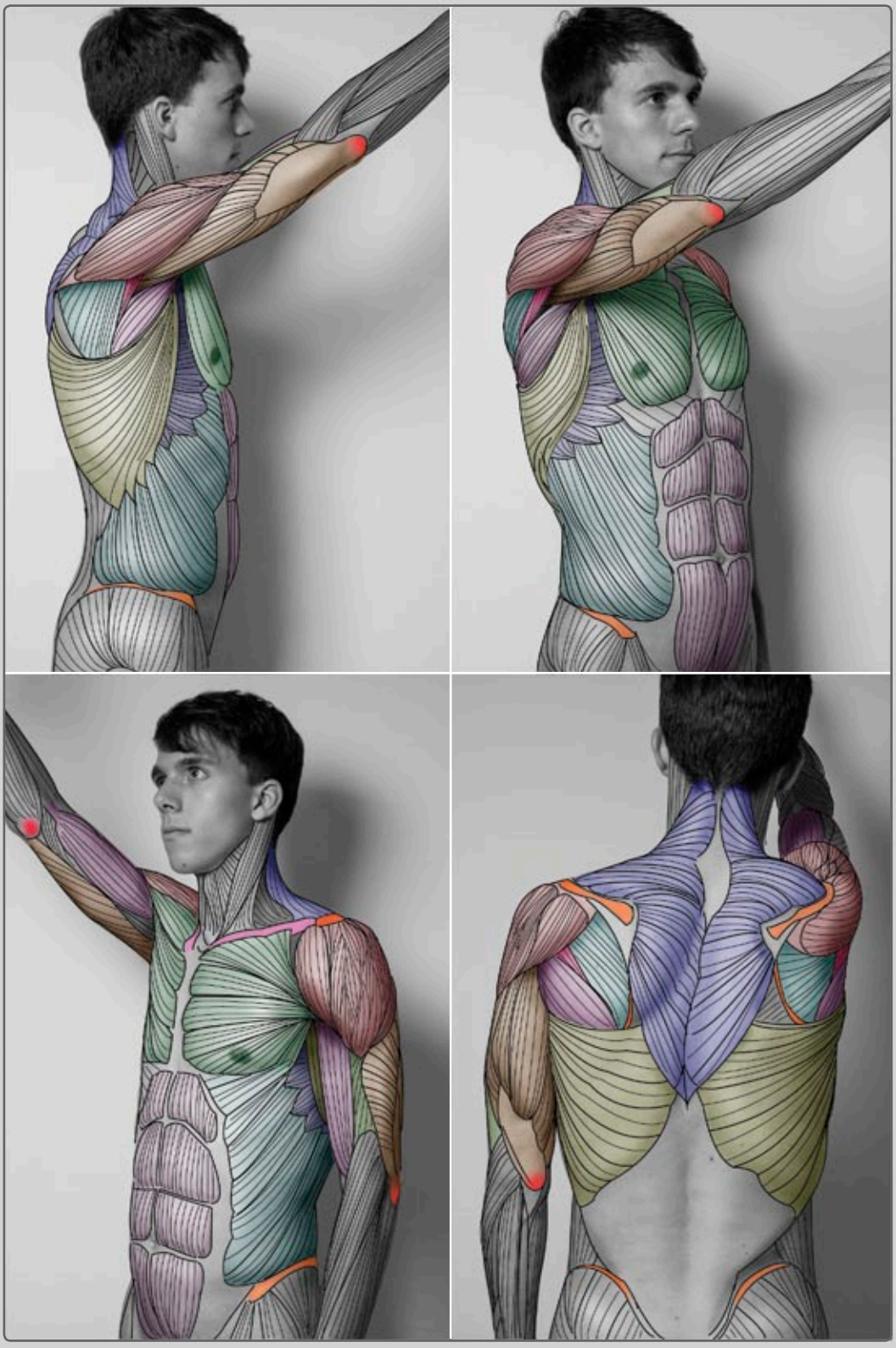
ARM REACHING UP AND FORWARD



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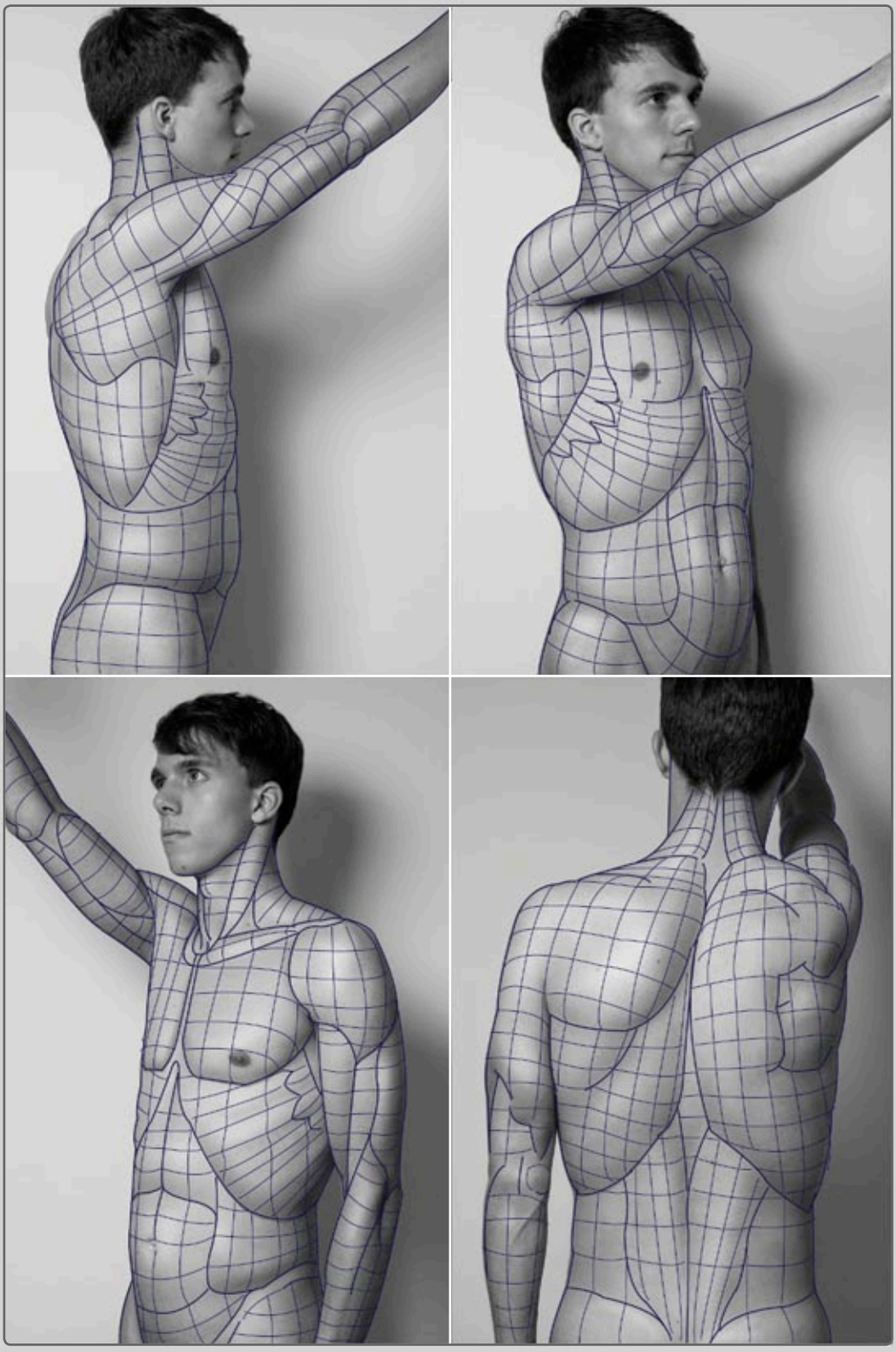
ARM REACHING UP AND FORWARD



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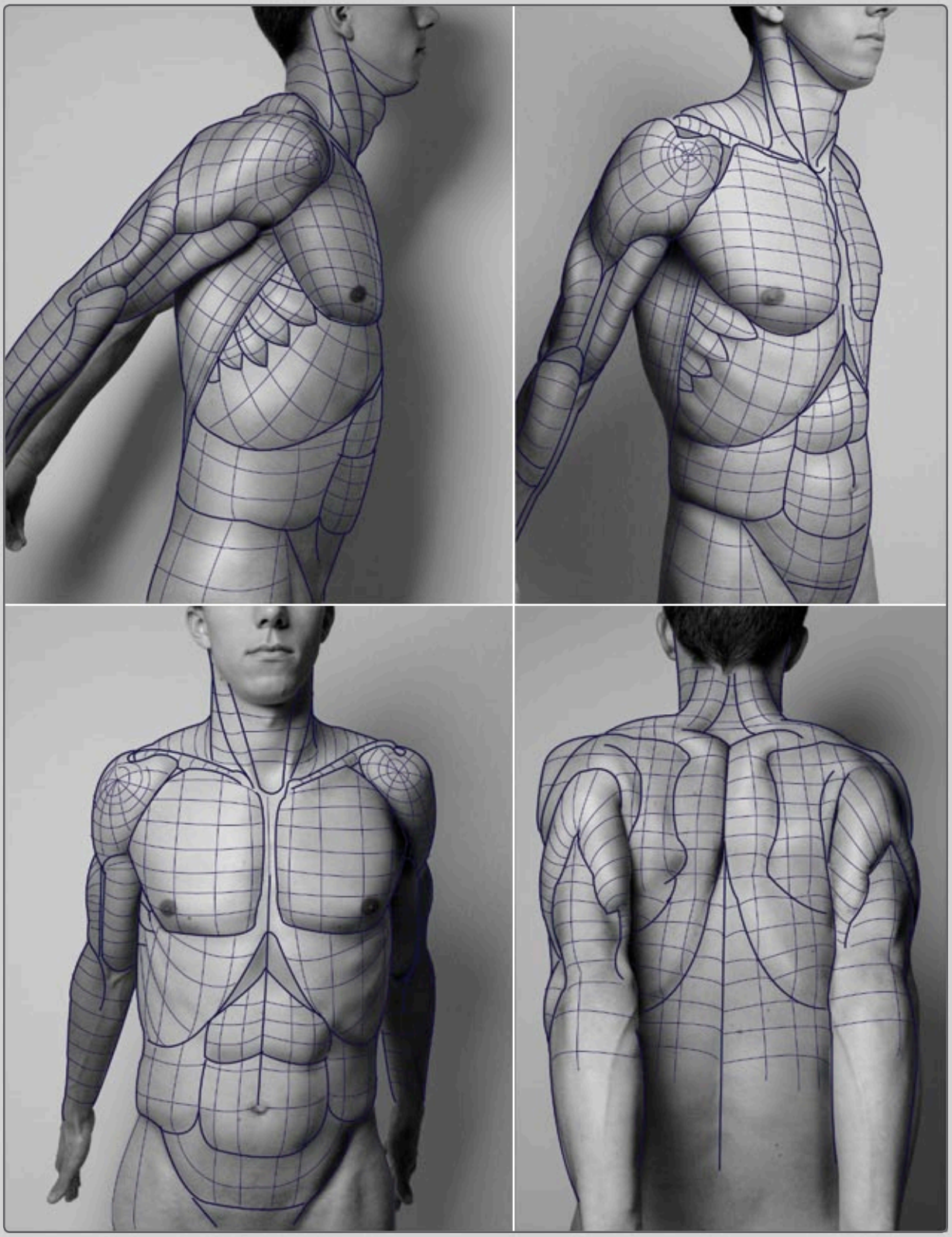
REACHING BACK



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REACHING BACK

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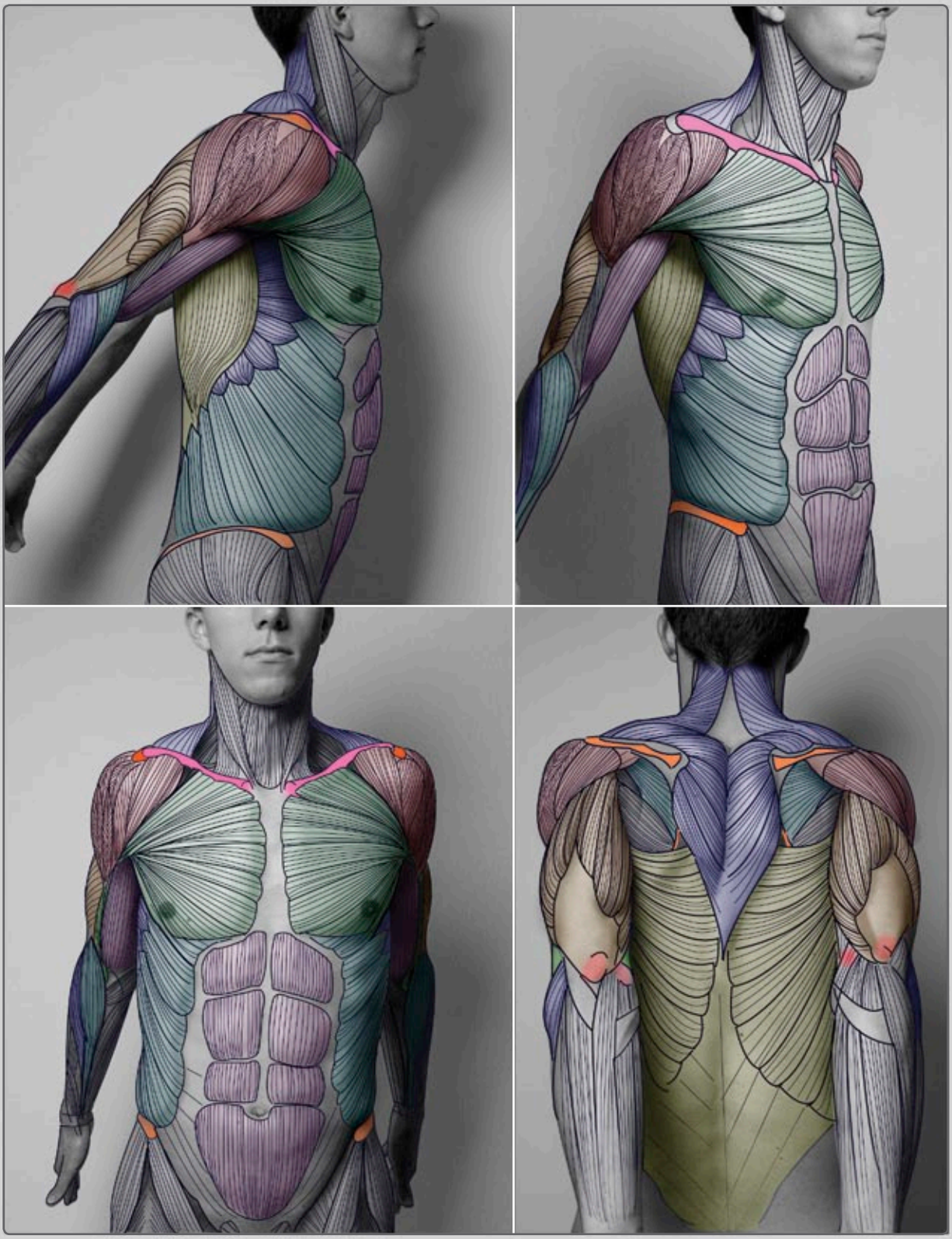
REACHING BACK



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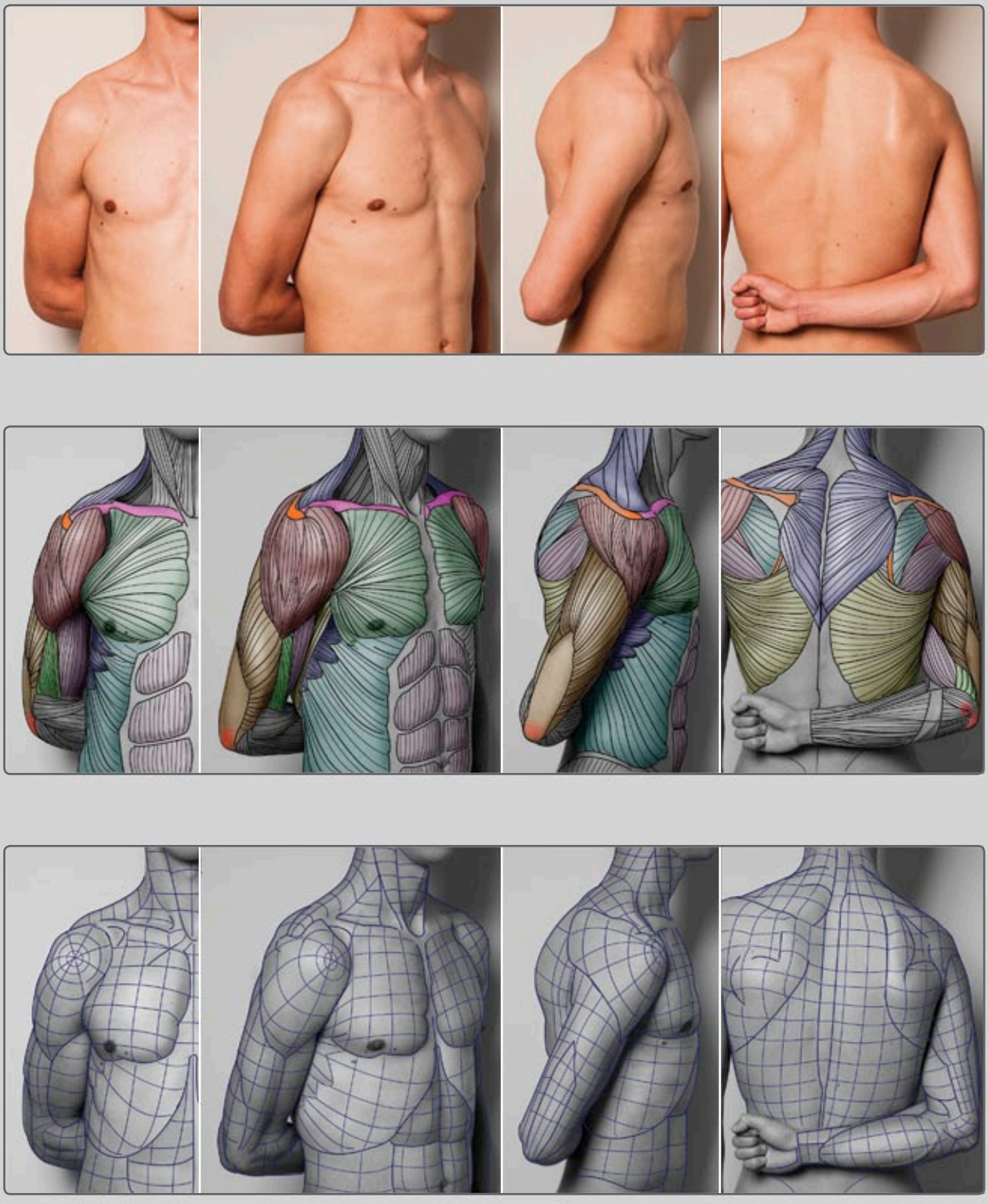
ONE ARM BEHIND BACK



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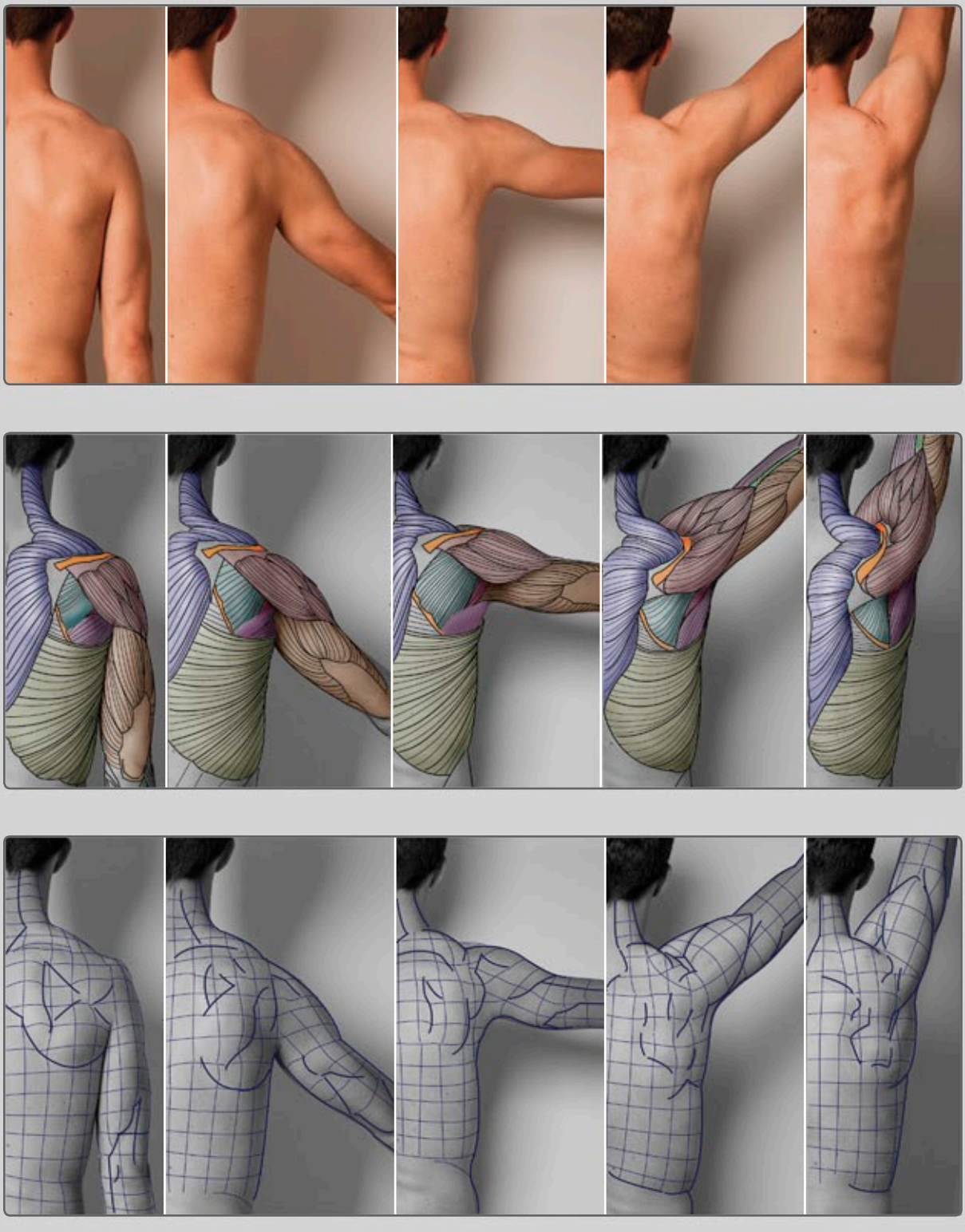
LIFTING ARM HIGHER AND HIGHER



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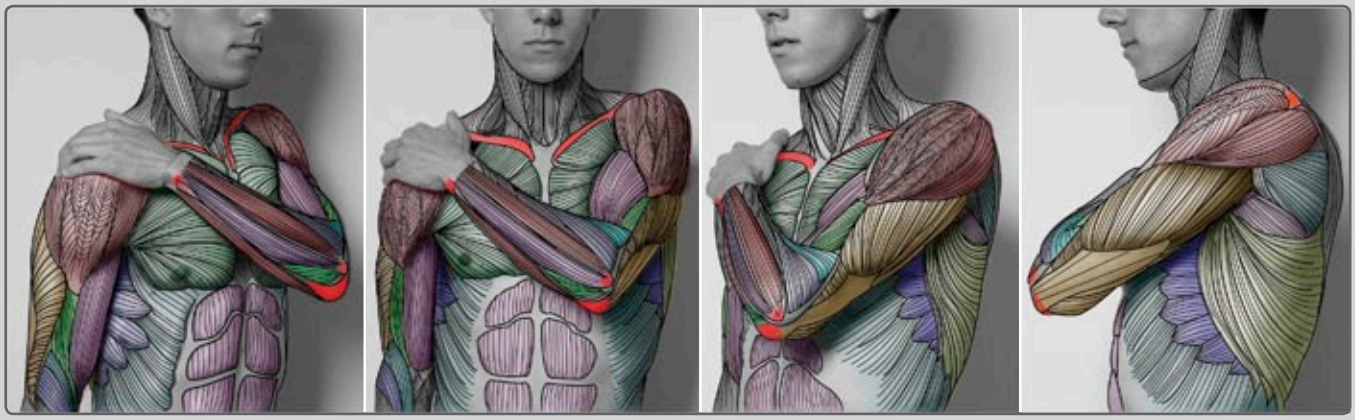
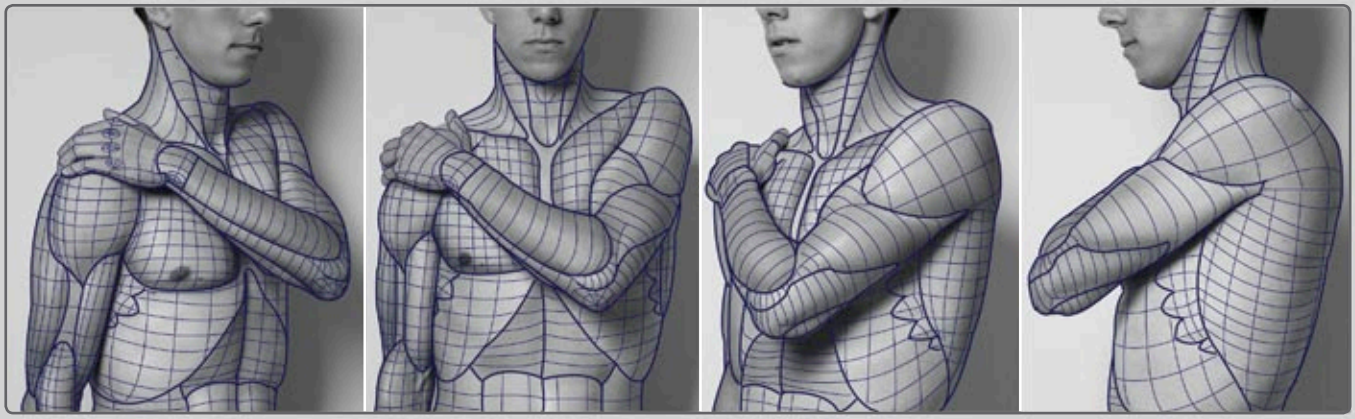
HAND HOLDING OPPOSITE SHOULDER





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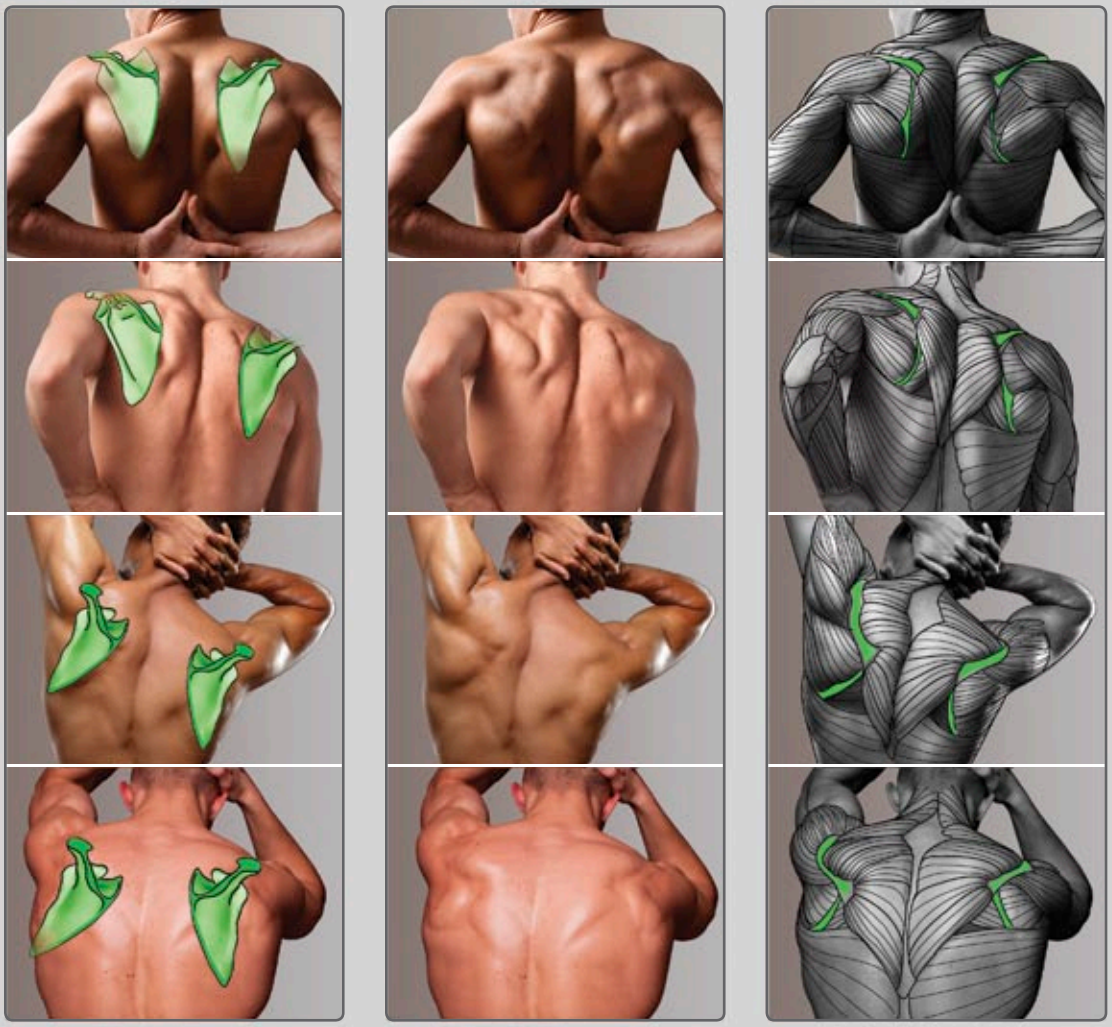
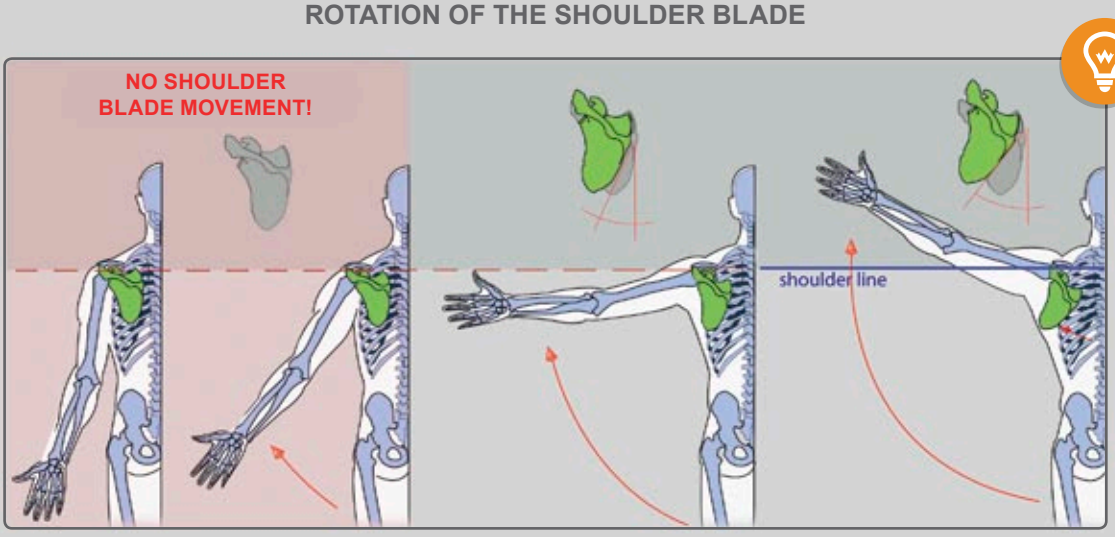
LET'S FIND SHOULDER BLADES (SCAPULA)!



ROTATION OF THE SHOULDER BLADE



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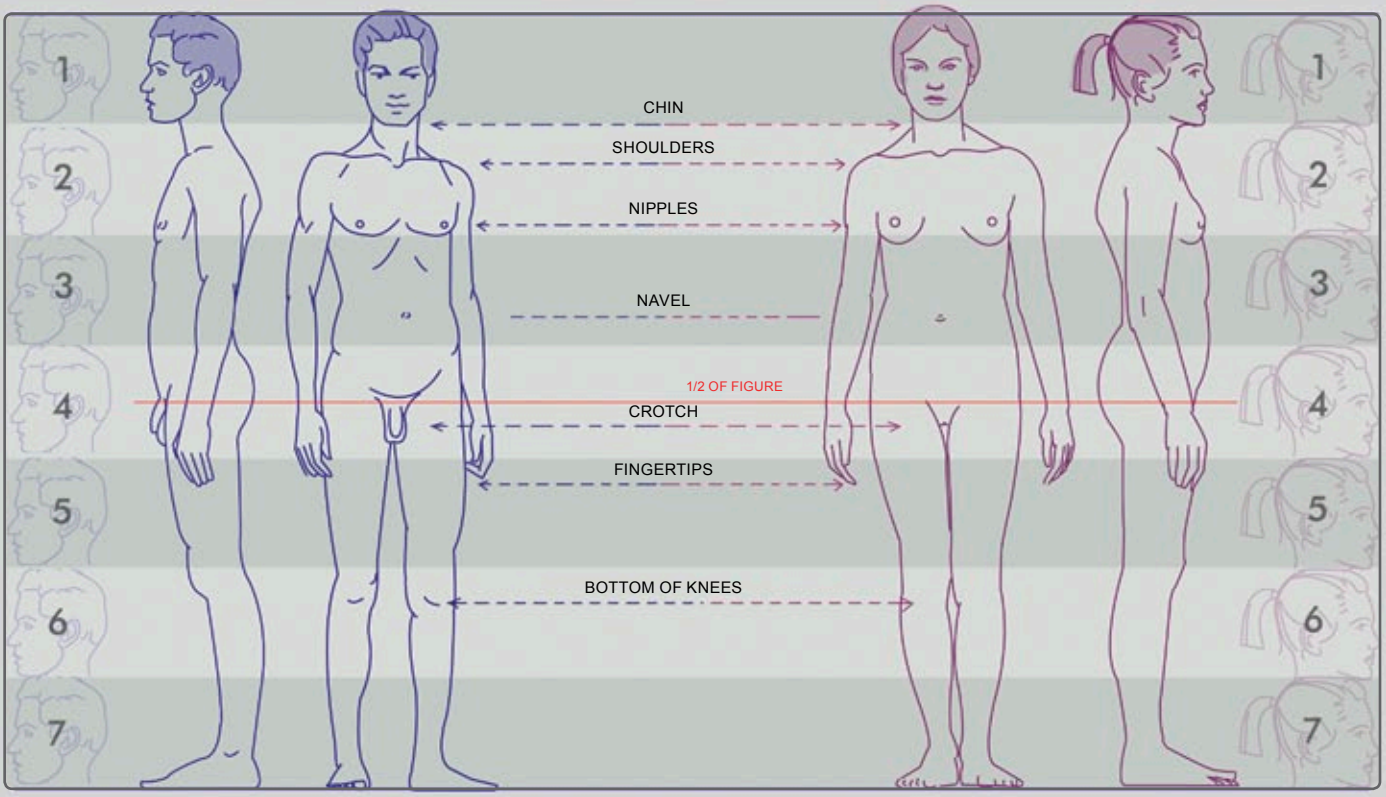
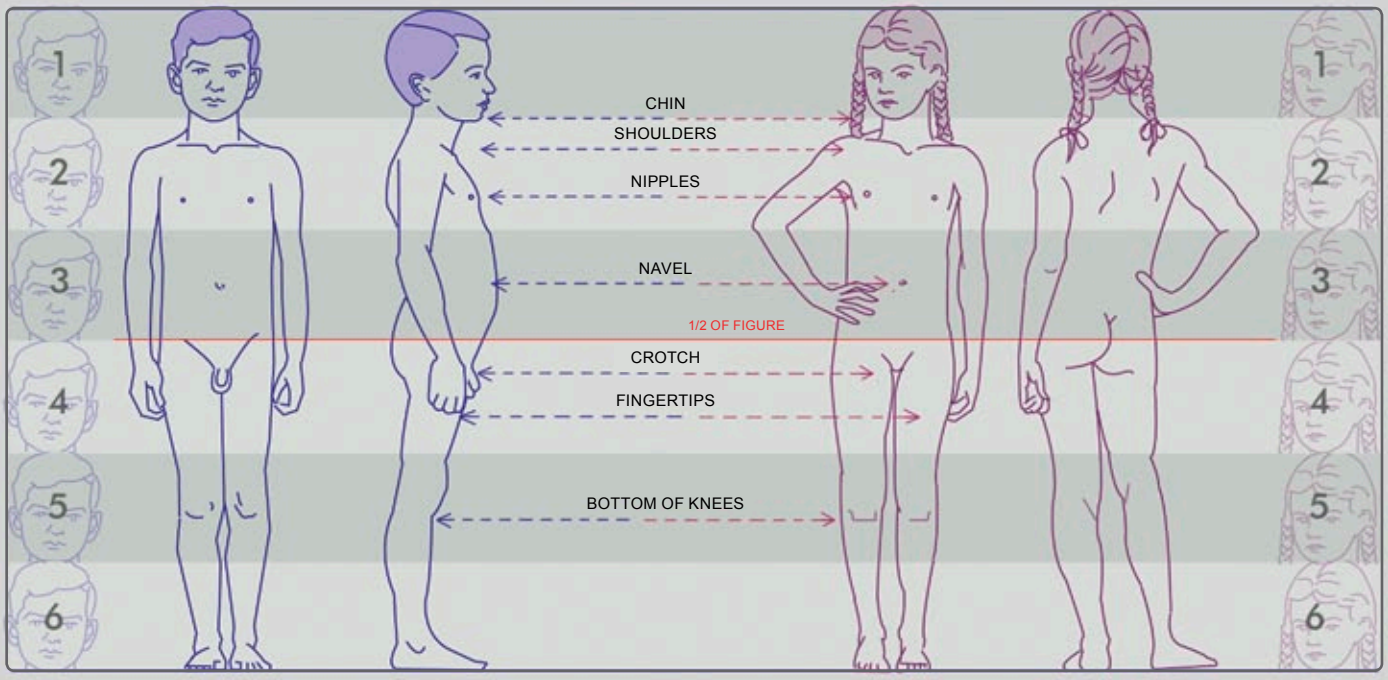
PROPORTIONS OF TEENAGER AND CHILD

TEENAGER PROPORTIONS - **7 HEAD** UNITS



CHILD PROPORTIONS (AGES 8 - 12) - **6 HEAD** UNITS



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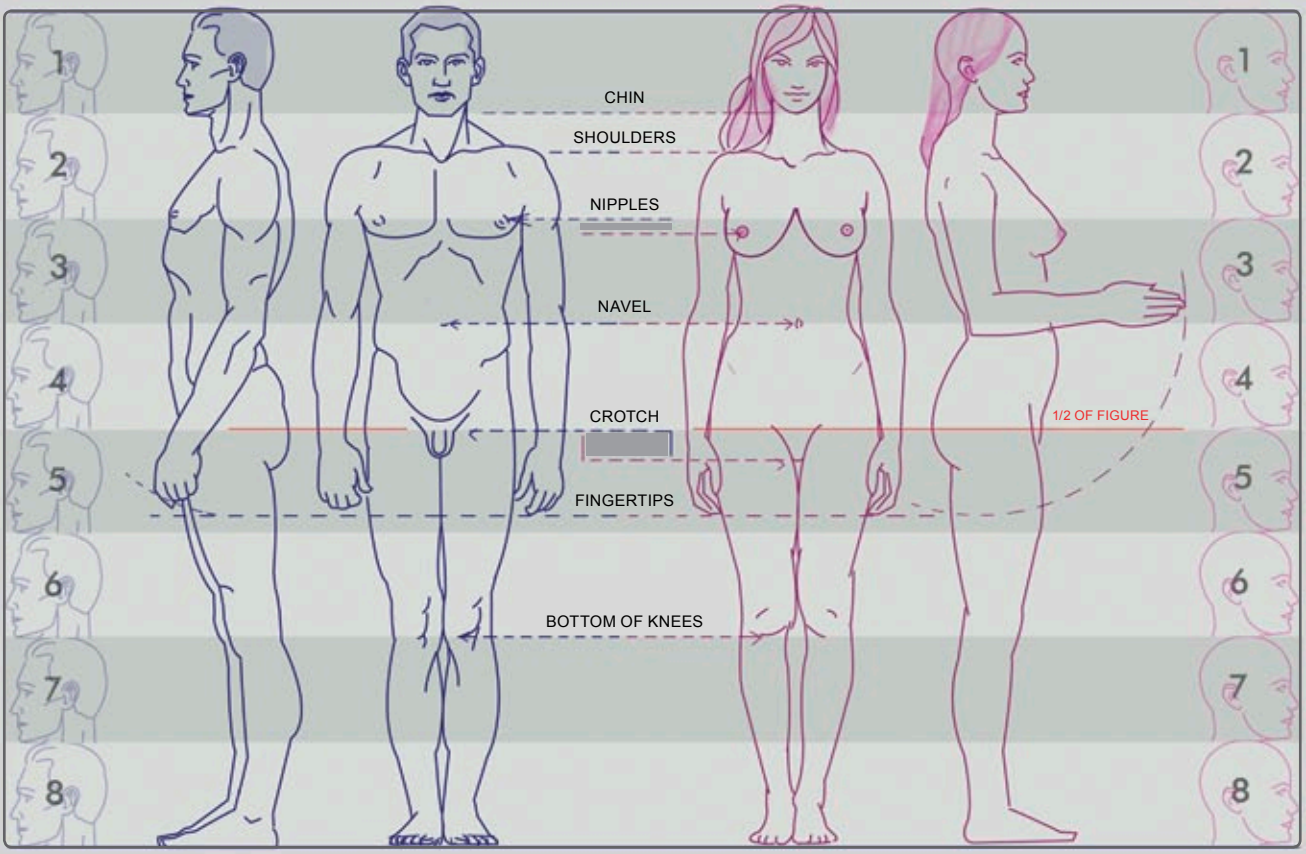
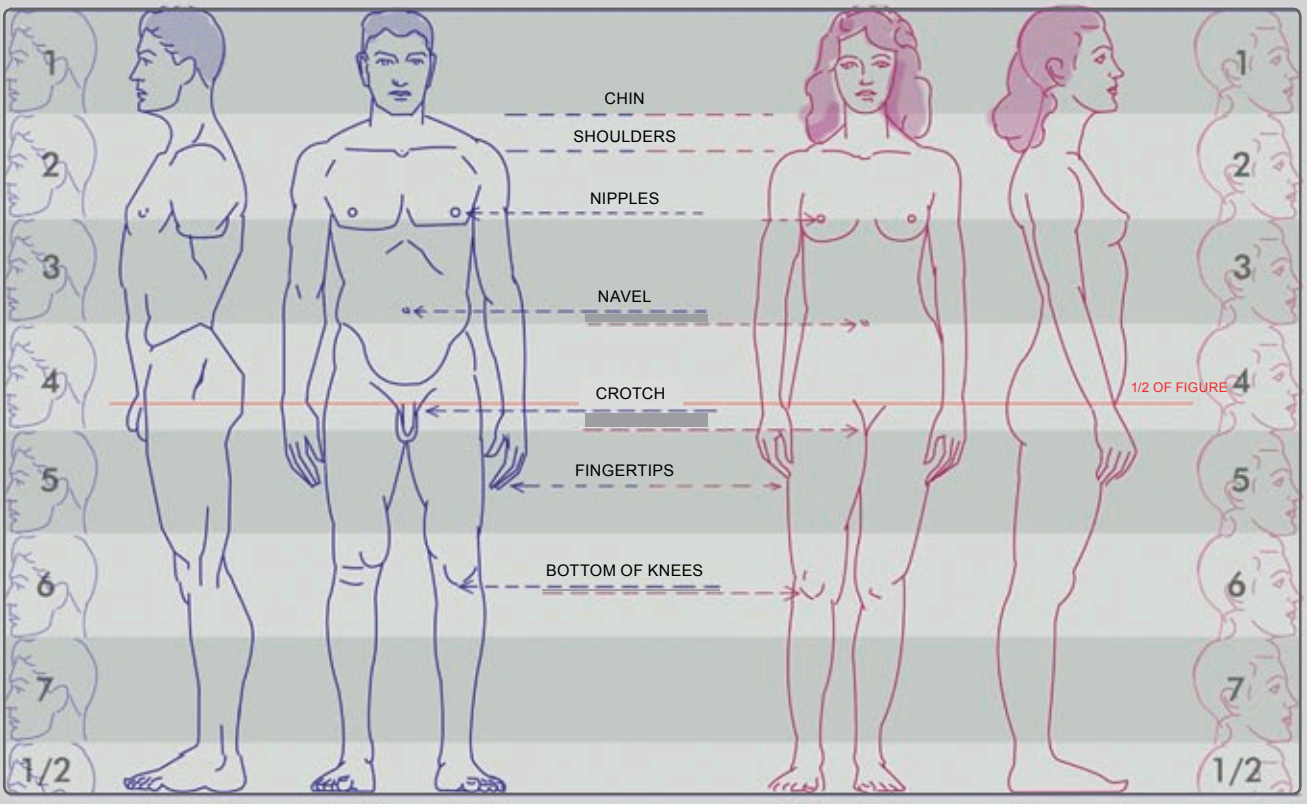
PROPORTIONS OF ADULT MALE AND FEMALE

IDEALIZED ADULT PROPORTIONS - **8 HEAD** UNITS



REALISTIC ADULT PROPORTIONS - **7.5 HEAD** UNITS



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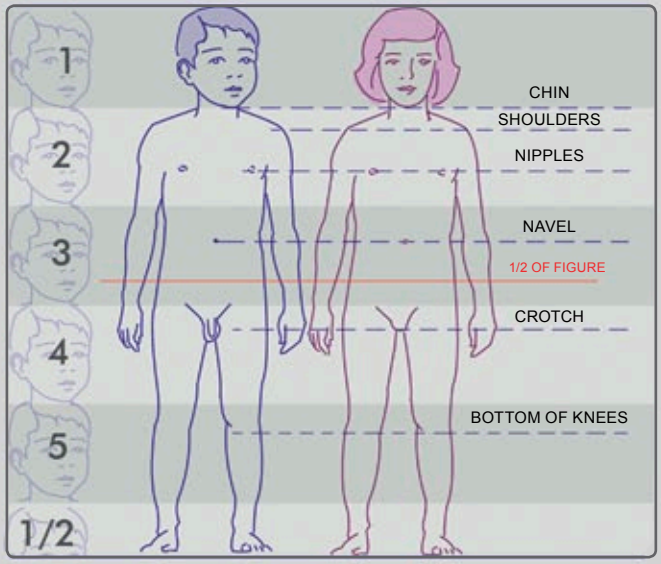
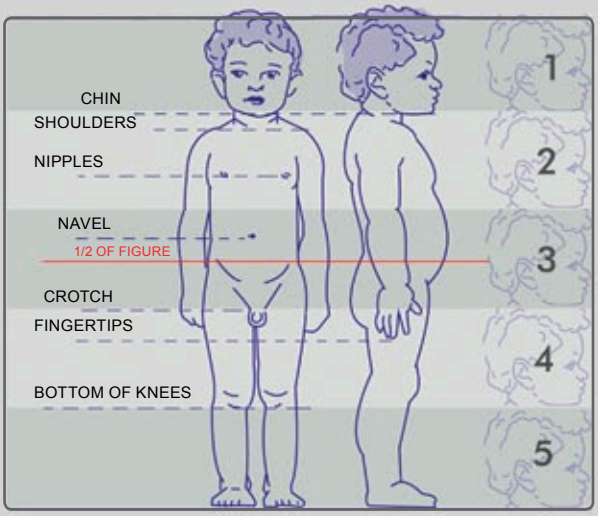
PROPORTIONS OF CHILD, TODDLER, NEWBORN AND SENIOR

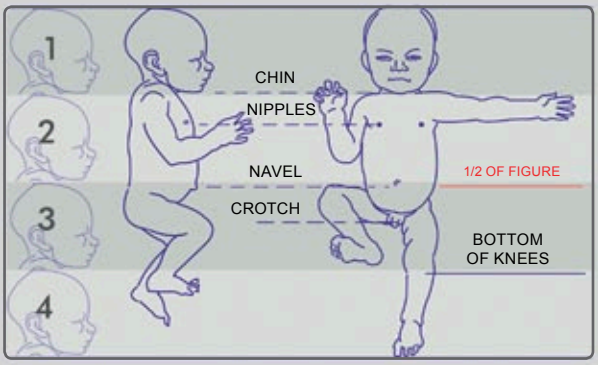
CHILD: **5.5 HEAD** UNITS



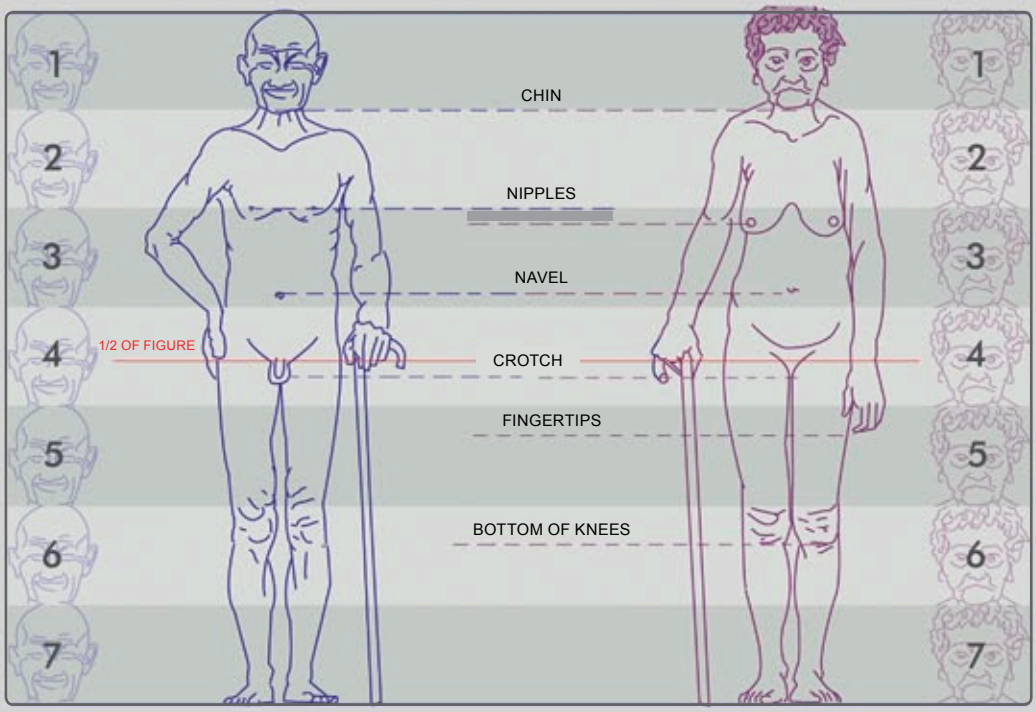
TODDLER: **5 HEAD** UNITS



NEWBORN: **4 HEAD** UNITS



SENIOR: **7 HEAD** UNITS



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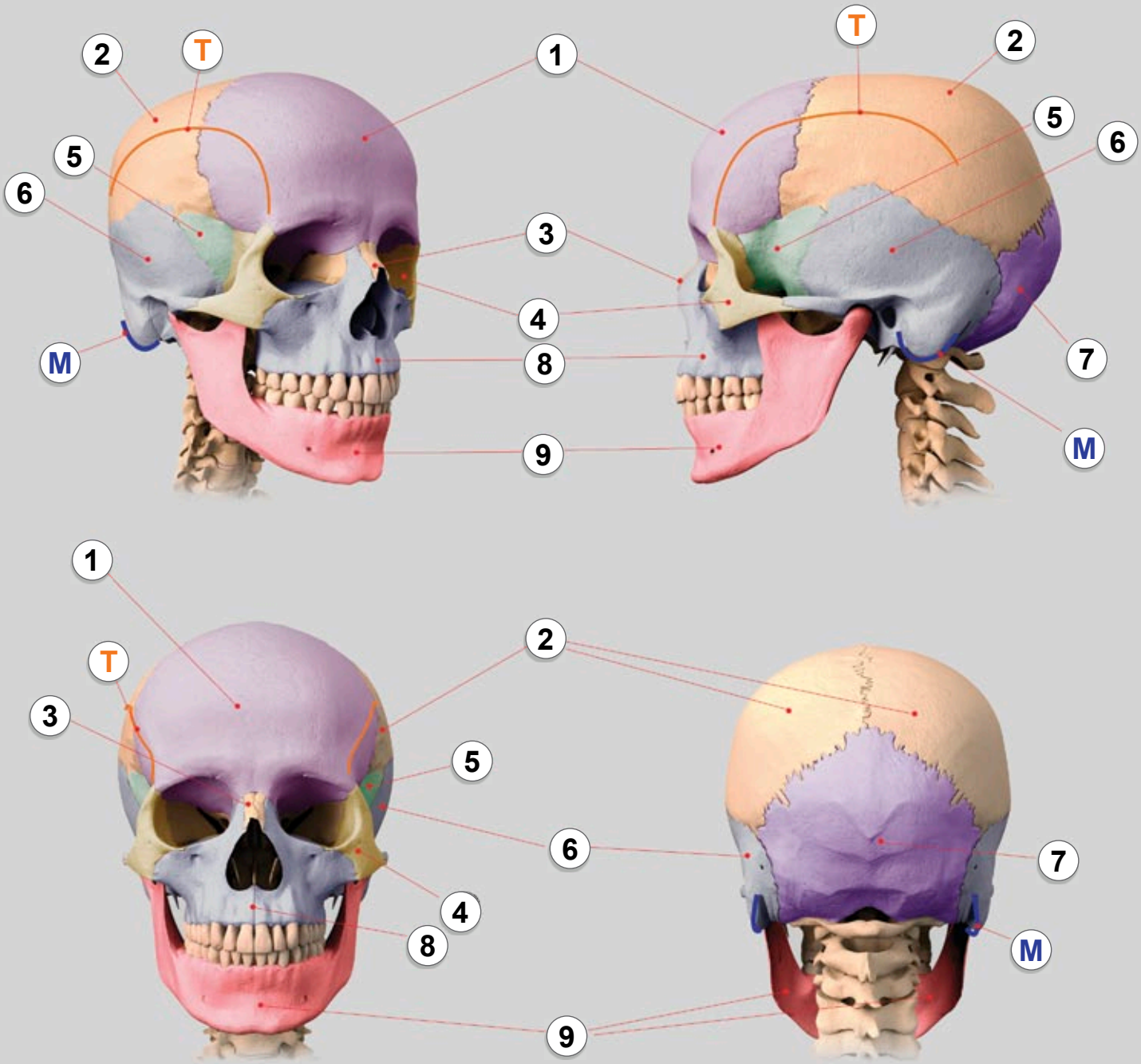
MAJOR SKULL BONES



1	FRONTAL BONE	4	ZYGOMATIC BONE	7	OCCIPITAL BONE
2	PARIETAL BONE	5	SPHENOID BONE	8	MAXILLA BONE
3	NASAL BONE	6	TEMPORAL BONE	9	MANDIBLE BONE
T	**TEMPORAL LINE**	M	**MASTOID PROCESS**		

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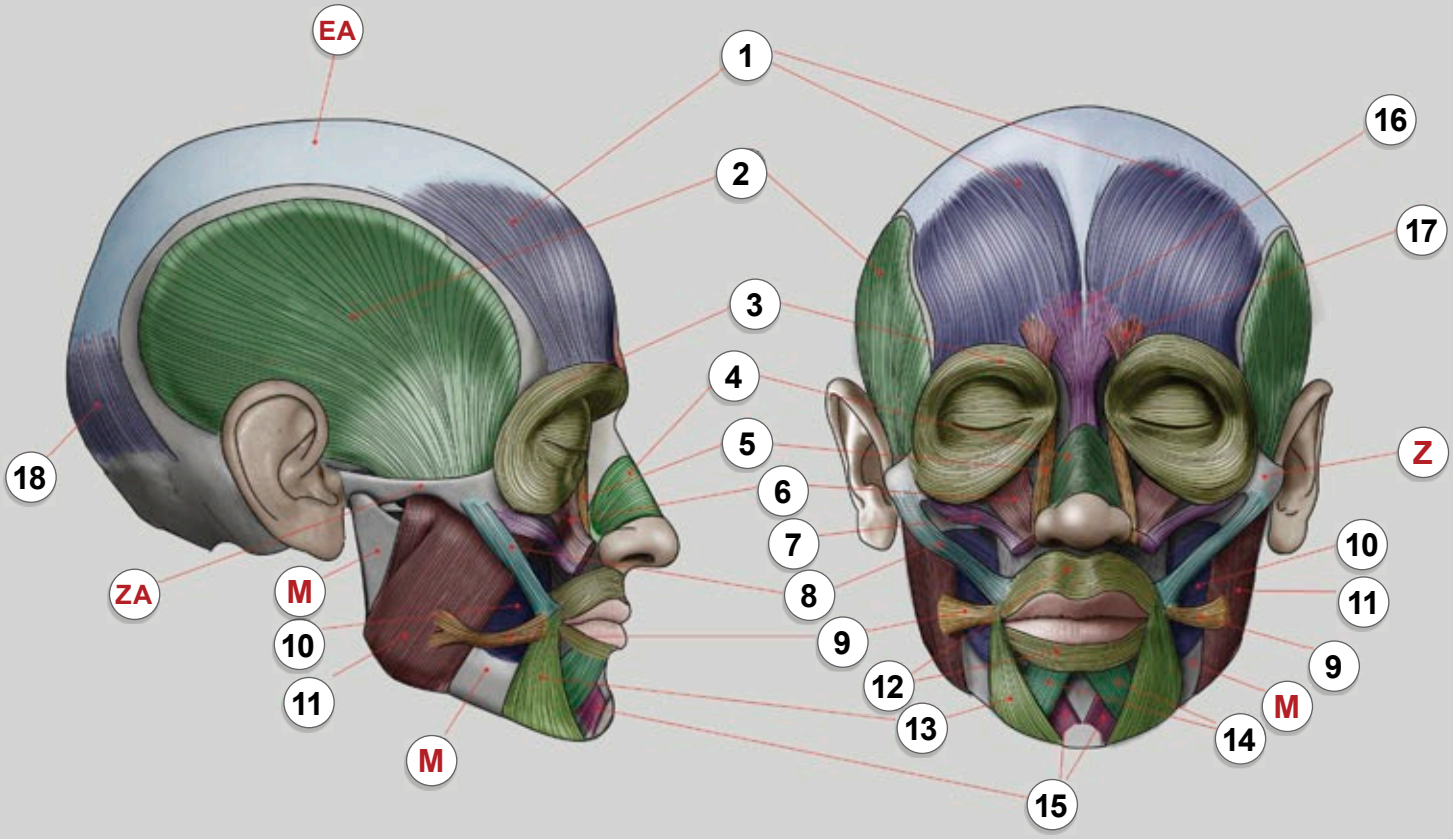
MAJOR HEAD MUSCLES



1	FRONTALIS MUSCLE	11	MASSETER MUSCLE
2	TEMPORAL MUSCLE	12	ORBICULARIS ORIS MUSCLE
3	ORBICULARIS OCULI MUSCLE	13	DEPRESSOR ANGULI ORIS MUSCLE
4	NASALIS MUSCLE	14	DEPRESSOR LABII INFERIORIS MUSCLE
5	OTTO'S MUSCLE	15	MENTALIS MUSCLE
6	LEVATOR LABII SUPERIORIS MUSCLE	16	PROCERUS MUSCLE
7	ZYGOMATICUS MINOR MUSCLE	17	CORRUGATOR MUSCLE
8	ZYGOMATICUS MAJOR MUSCLE	18	OCCIPITALIS MUSCLE
9	RISORIUS MUSCLE	Z	ZYGOMATIC BONE
10	BUCCINATOR MUSCLE	ZA	ZYGOMATIC ARCH
M	MANDIBLE (LOWER JAW)	EA	EPICRANIAL APONEUROSIS

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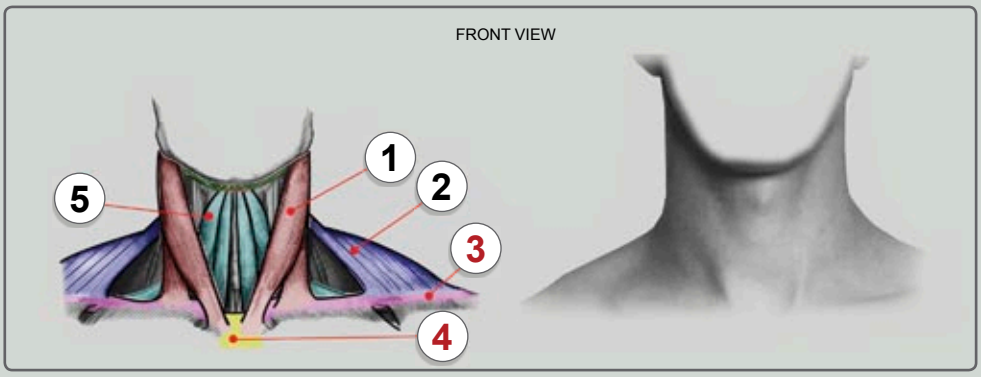
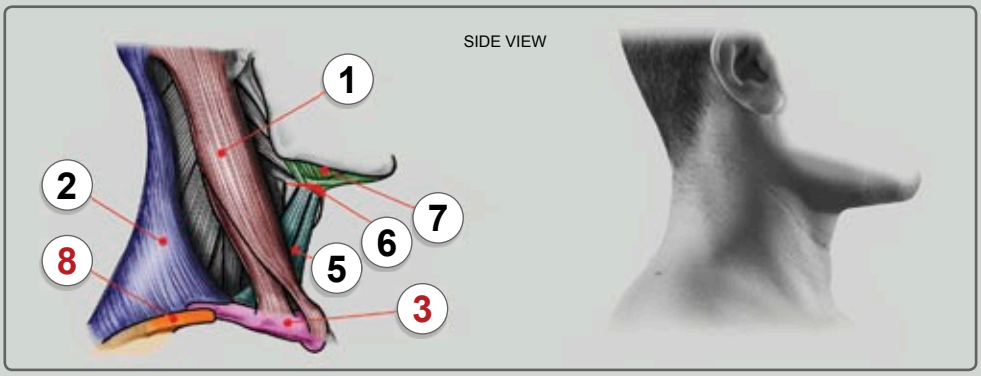
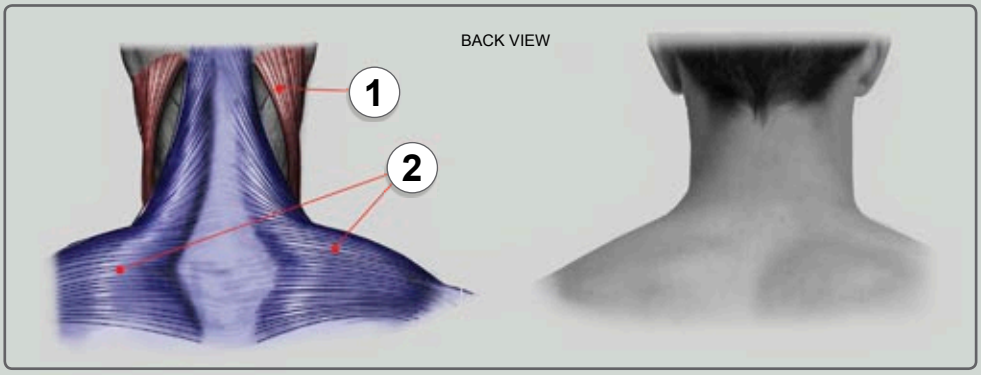
MAIN NECK MUSCLES







1	STERNOCLEIDOMASTOID	4	CHEST BONE (STERNUM)	7	SUPRAHYOID MUSCLES
2	TRAPEZIUS	5	INFRAHYOID MUSCLES	8	SHOULDER BLADE (SCAPULA)
3	COLLAR BONE (CLAVICLE)	6	HYOID BONE		

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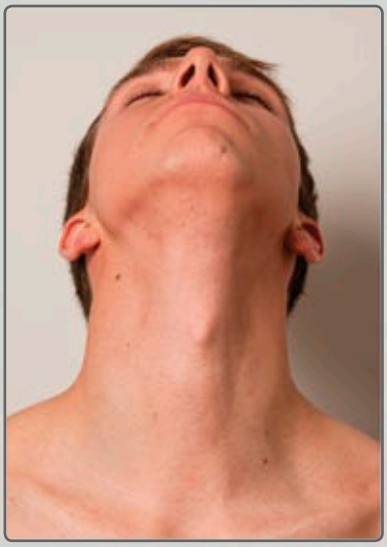
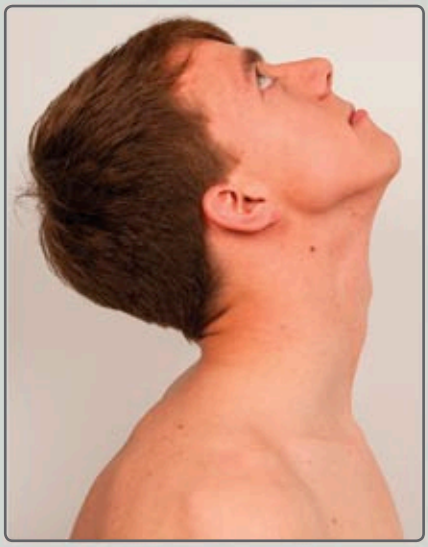
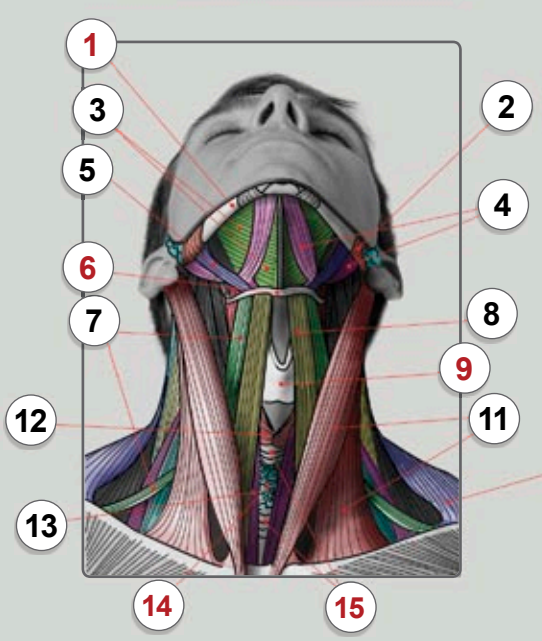
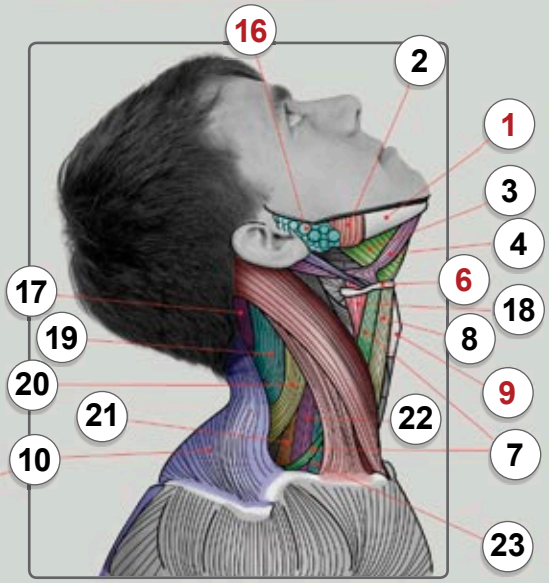
MAIN NECK MUSCLES









1	LOWER JAW (MANDIBLE)	9	ADAM'S APPLE (LARYNGEAL PROMINENCE)	17	SEMISPINALIS CAPITIS
2	MASSETER	10	TRAPEZIUS	18	HYOGLOSSUS
3	MYLOHYOID	11	STERNOCLEIDOMASTOID	19	SPLENIUS CAPITIS
4	DIGASTRIC	12	CRICOTHYROID	20	LEVATOR SCAPULAE
5	STYLOHYOID	13	STERNOTHYROID	21	SCALENUS POSTERIOR
6	HYOID BONE	14	THYROID GLAND	22	SCALENUS MEDIUS
7	OMOHYOID	15	TRACHEA	23	SCALENUS ANTERIOR
8	STERNOHYOID	16	PAROTID GLAND		

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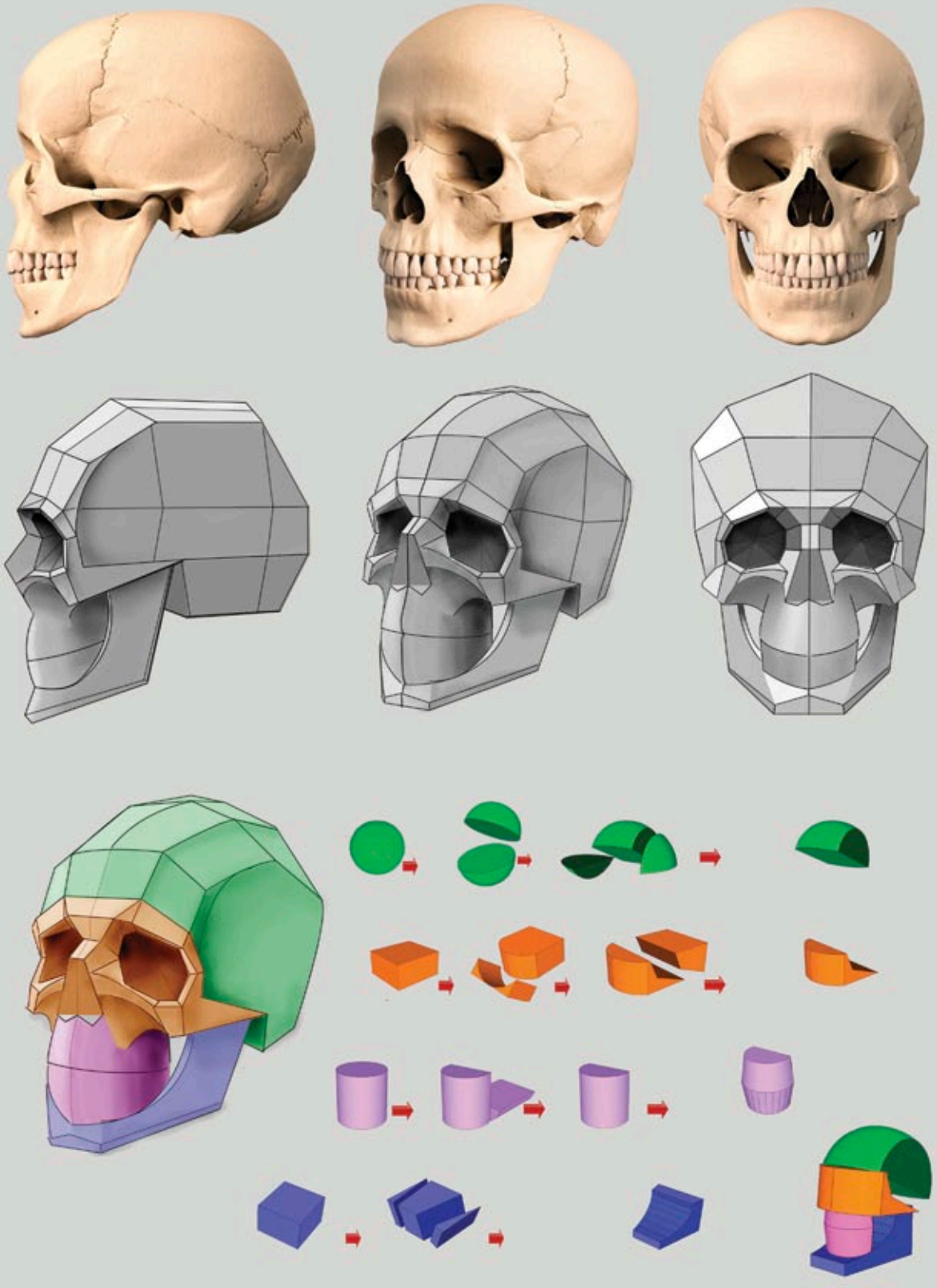
SHAPES THAT FORM A SKULL



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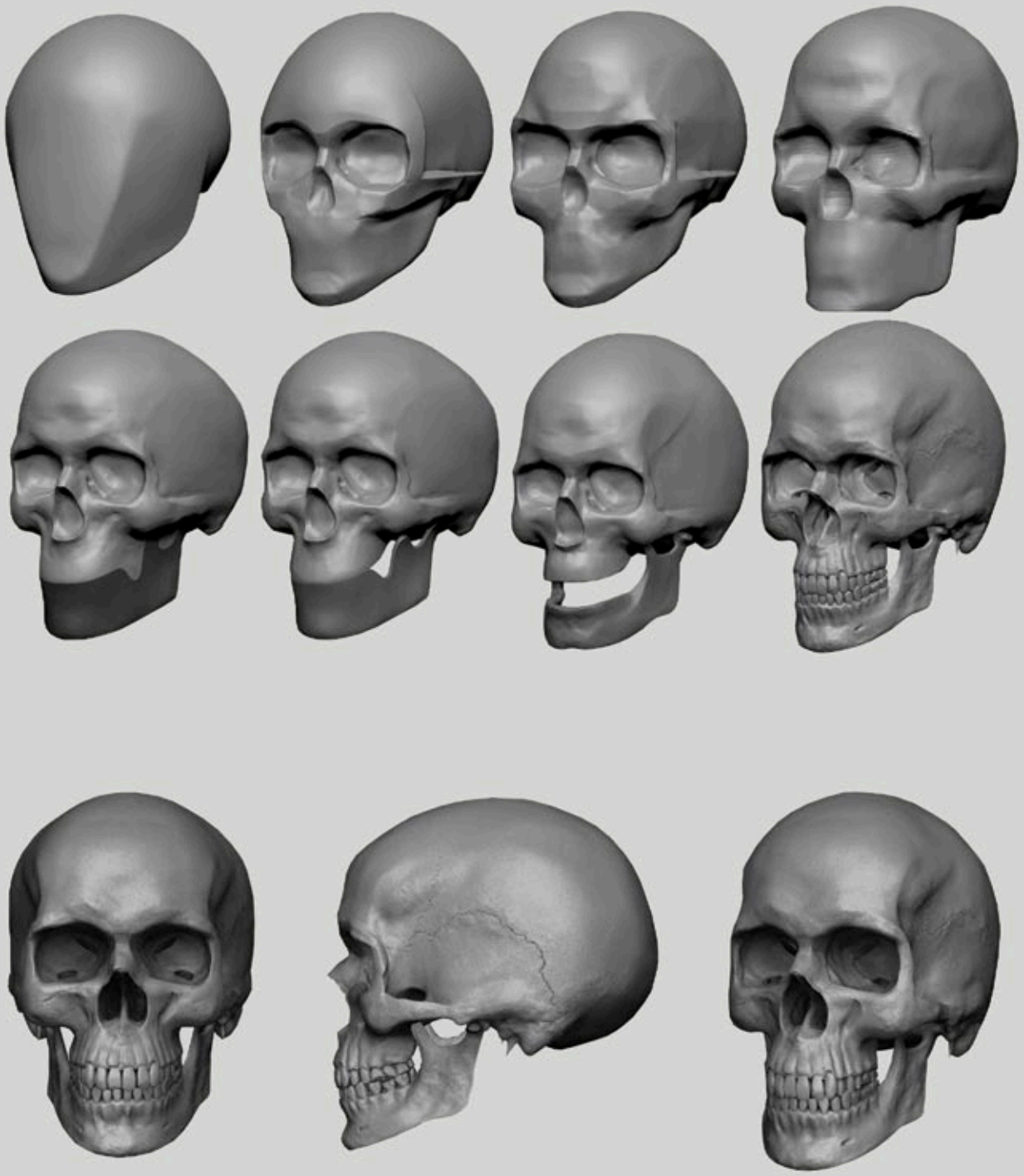
MODELING A 3D SKULL



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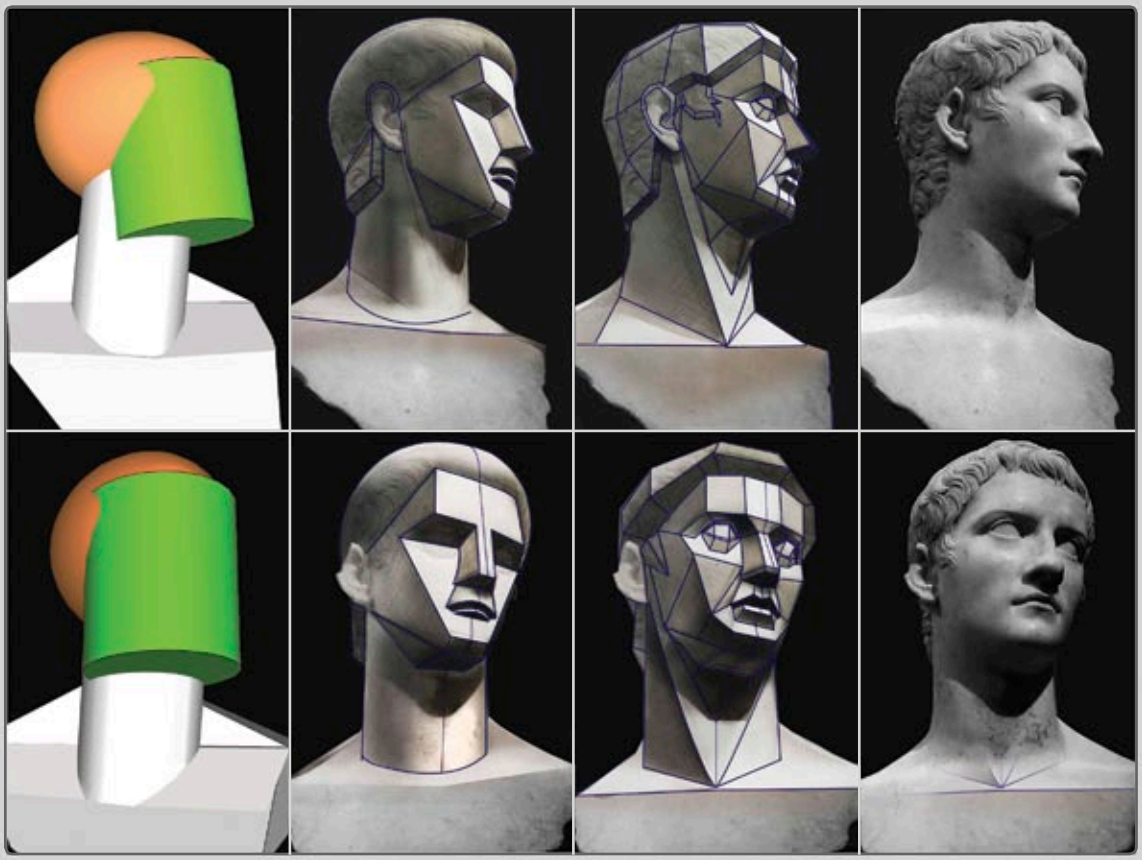
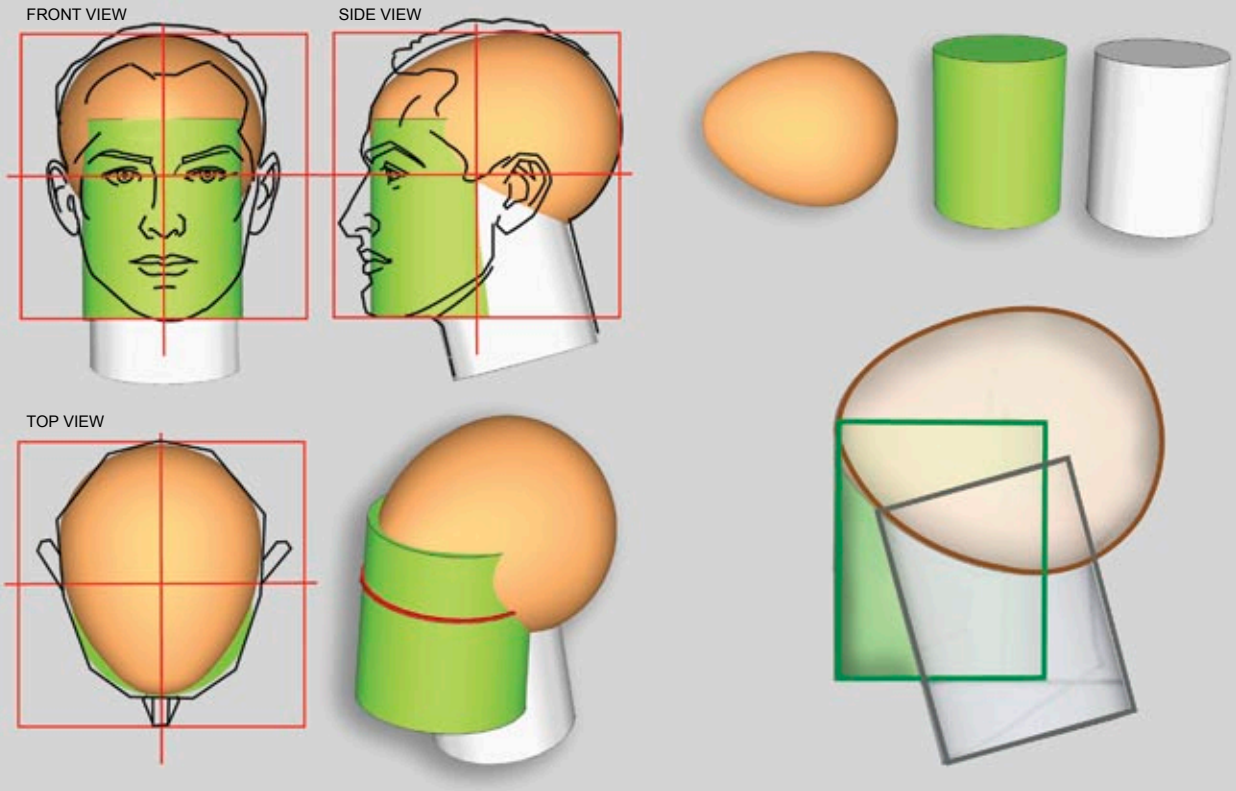
HEAD SHAPE AND MASSES





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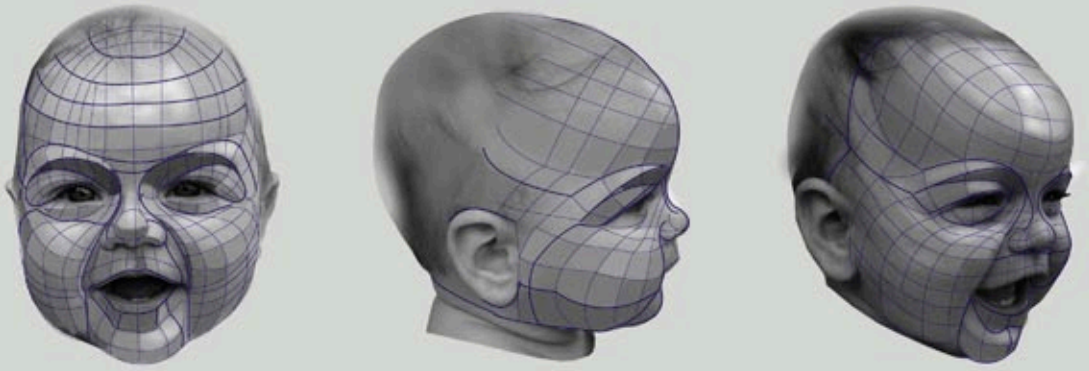
BABY HEAD

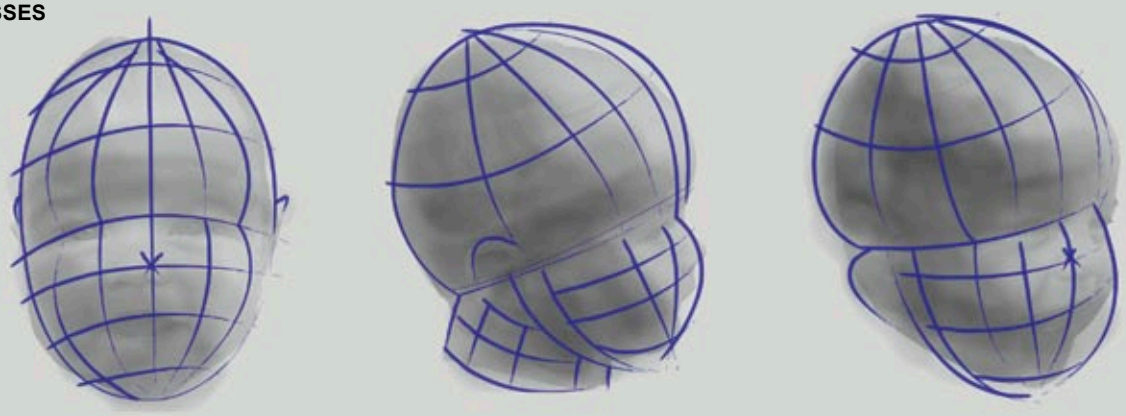
REAL

MESH



BLOCK-OUT

MASSES



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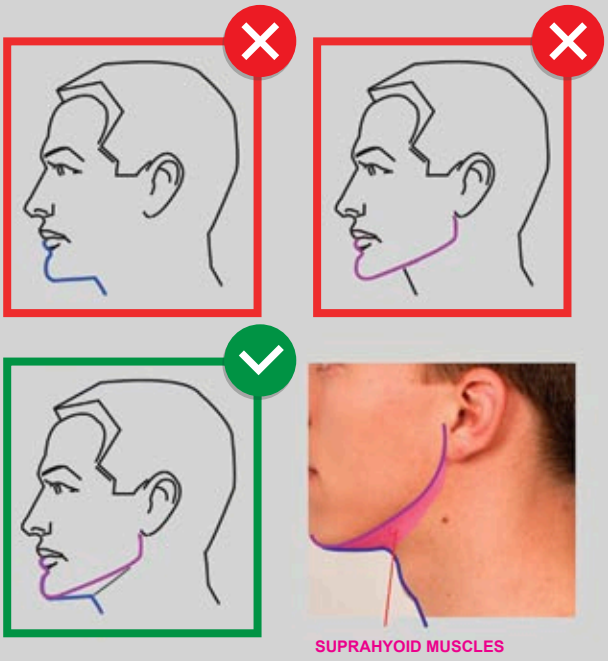
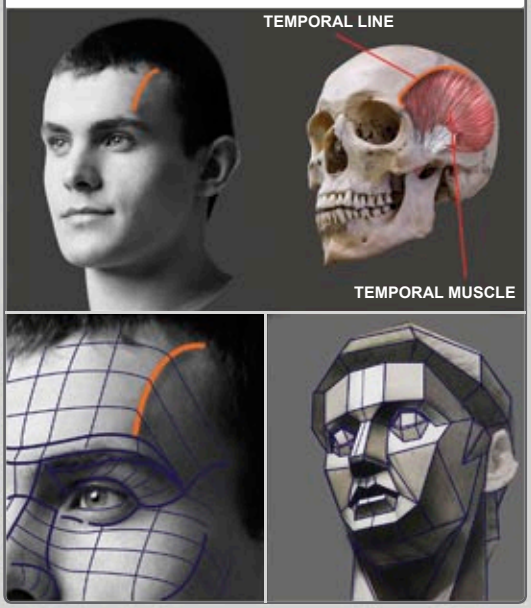
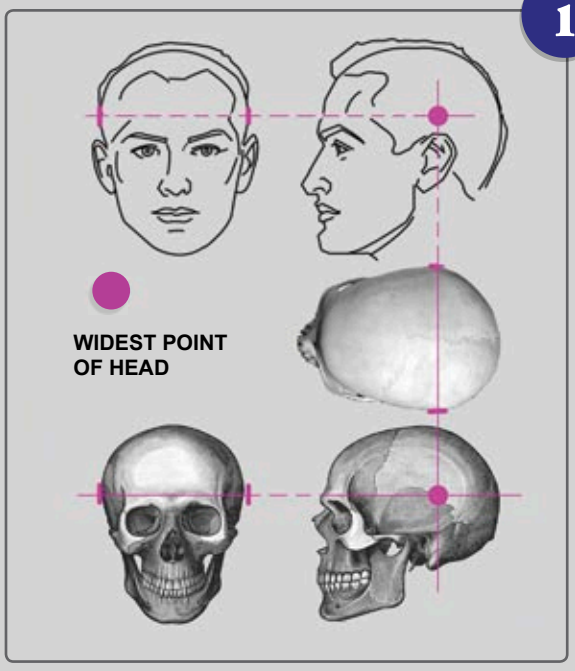
THE HEAD SHAPE

CONTOUR OF THE CHIN
IS NOT THE SAME AS **JAWLINE**.

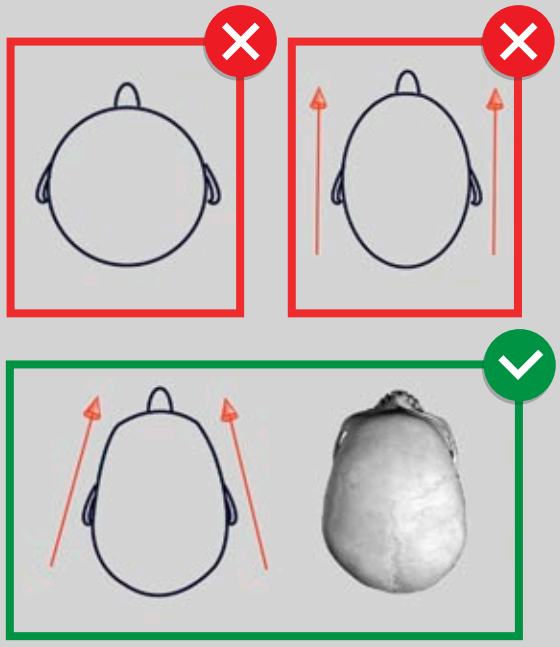


TEMPORAL LINE (THE EDGE BETWEEN TEMPORAL BONE AND FOREHEAD PLANE).





HEAD IS NOT ROUND.



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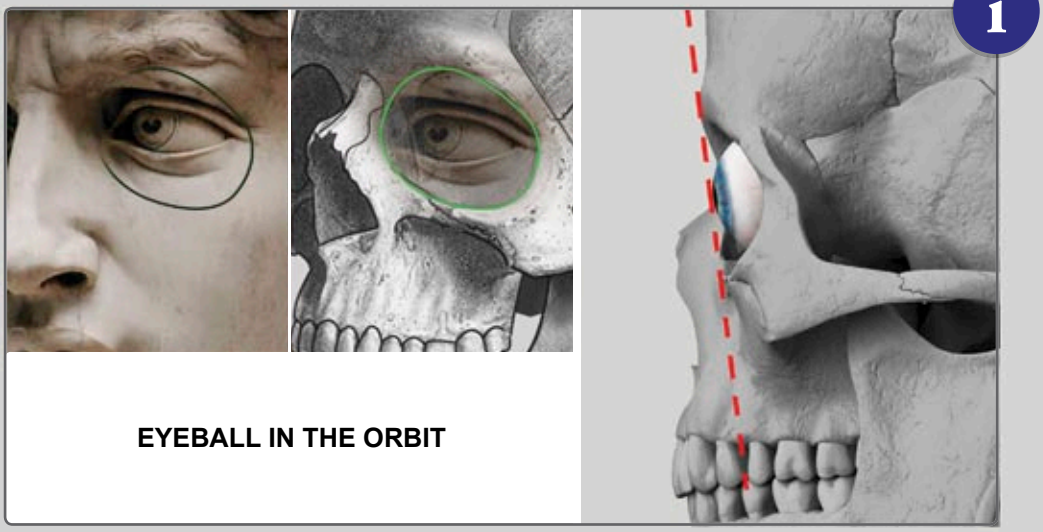
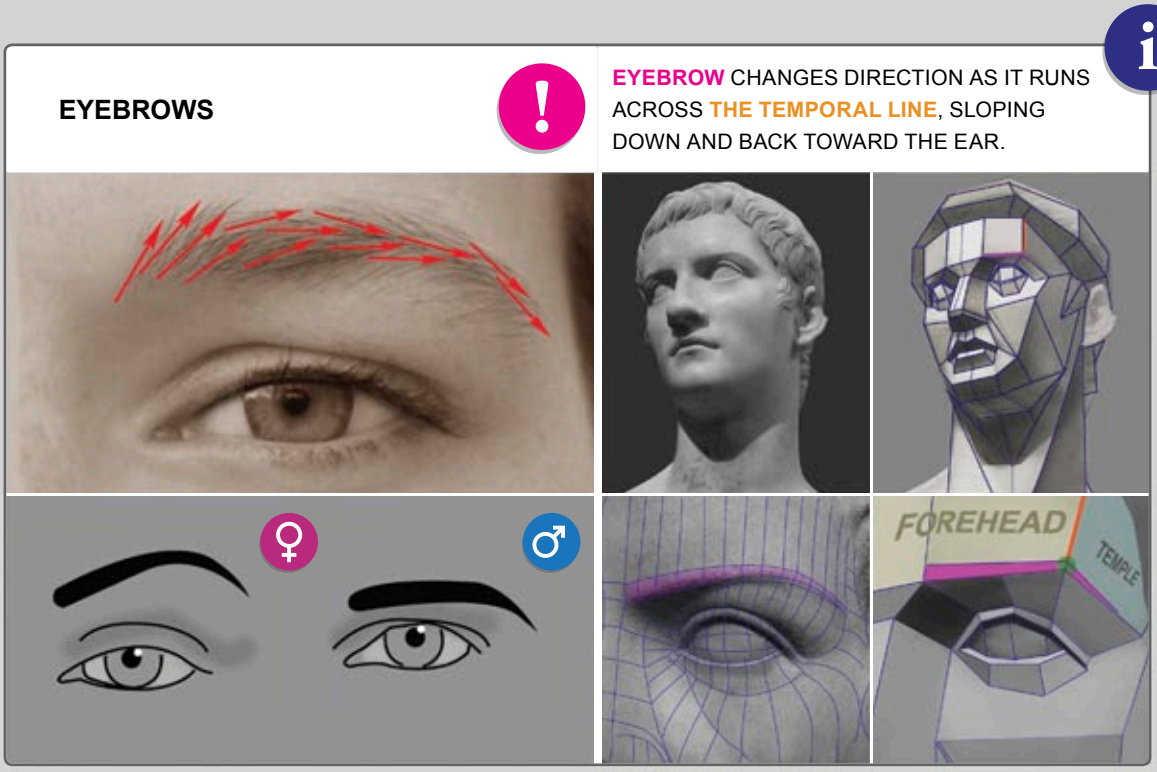
FRAMING THE EYES



EYEBALL IN THE ORBIT



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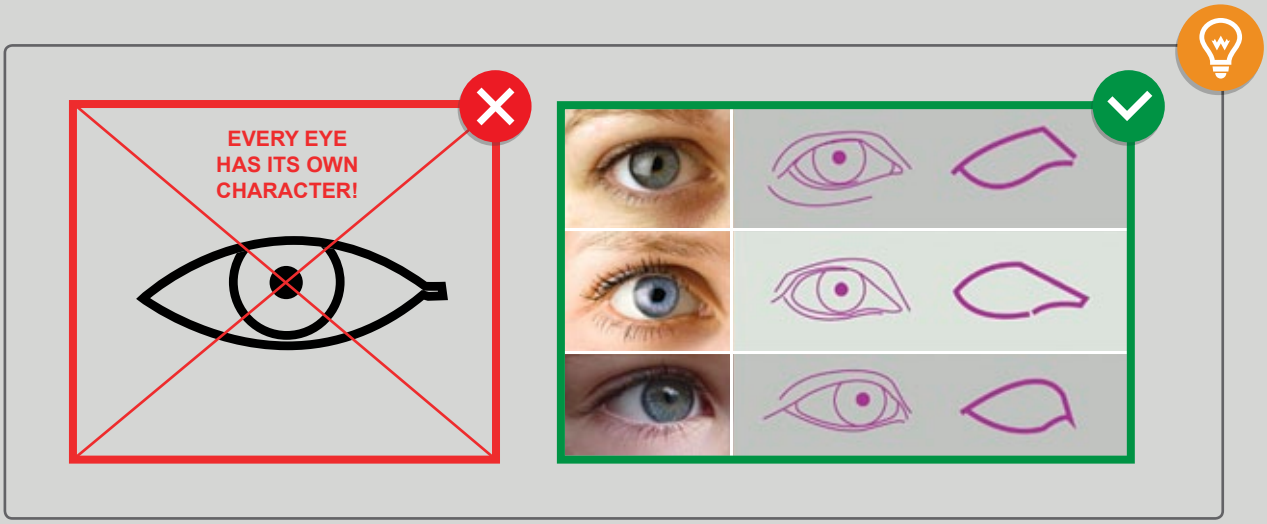
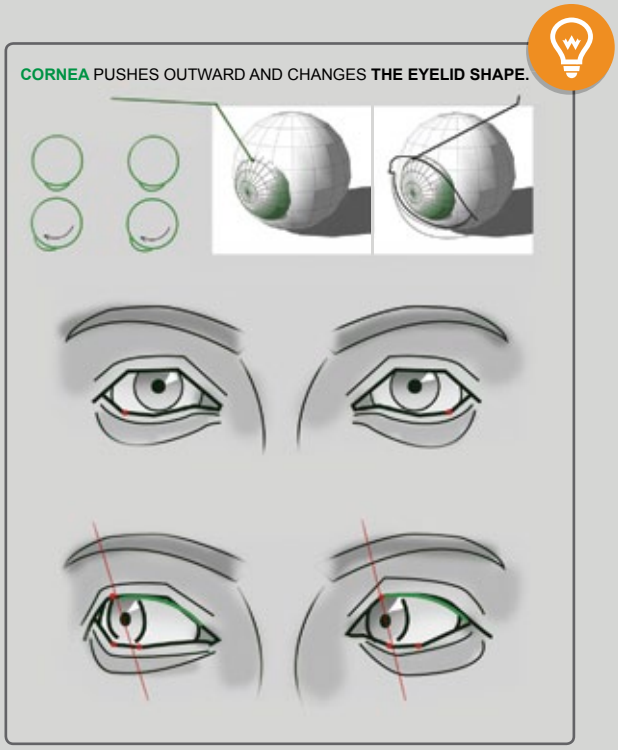
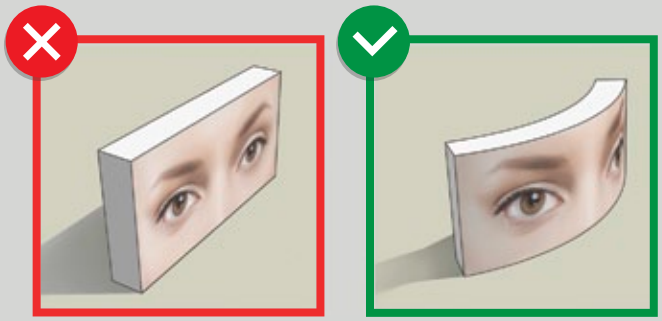
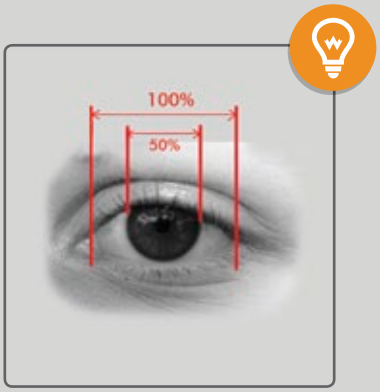
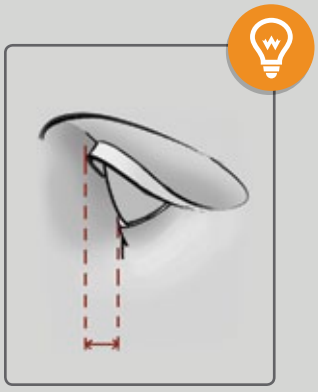
ALL ABOUT EYES

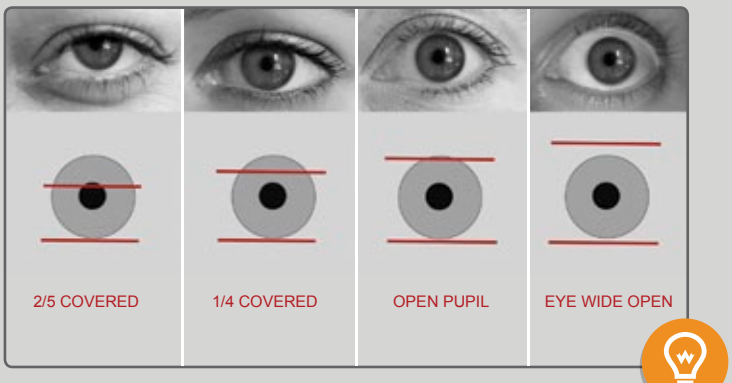












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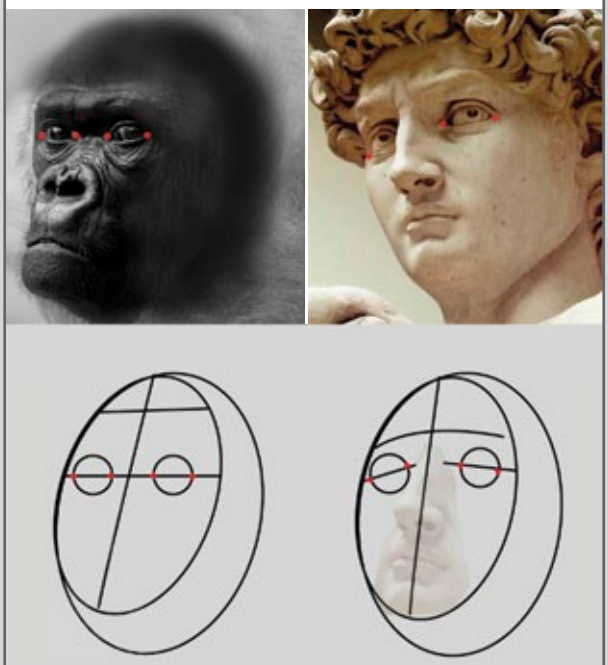
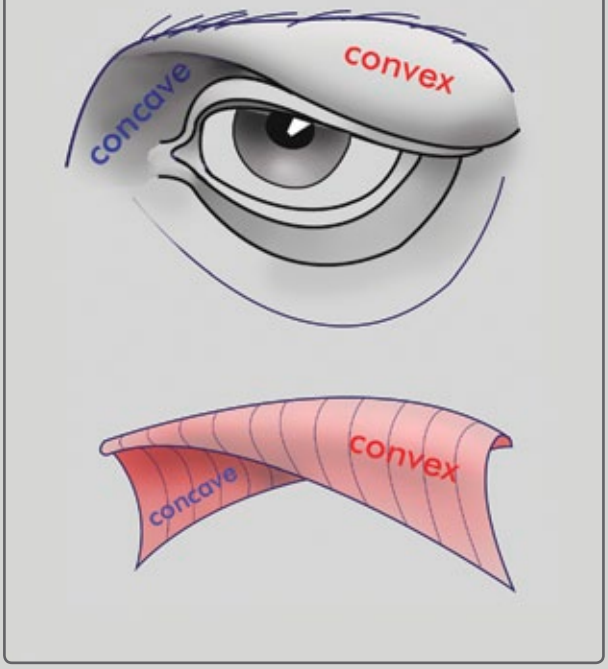
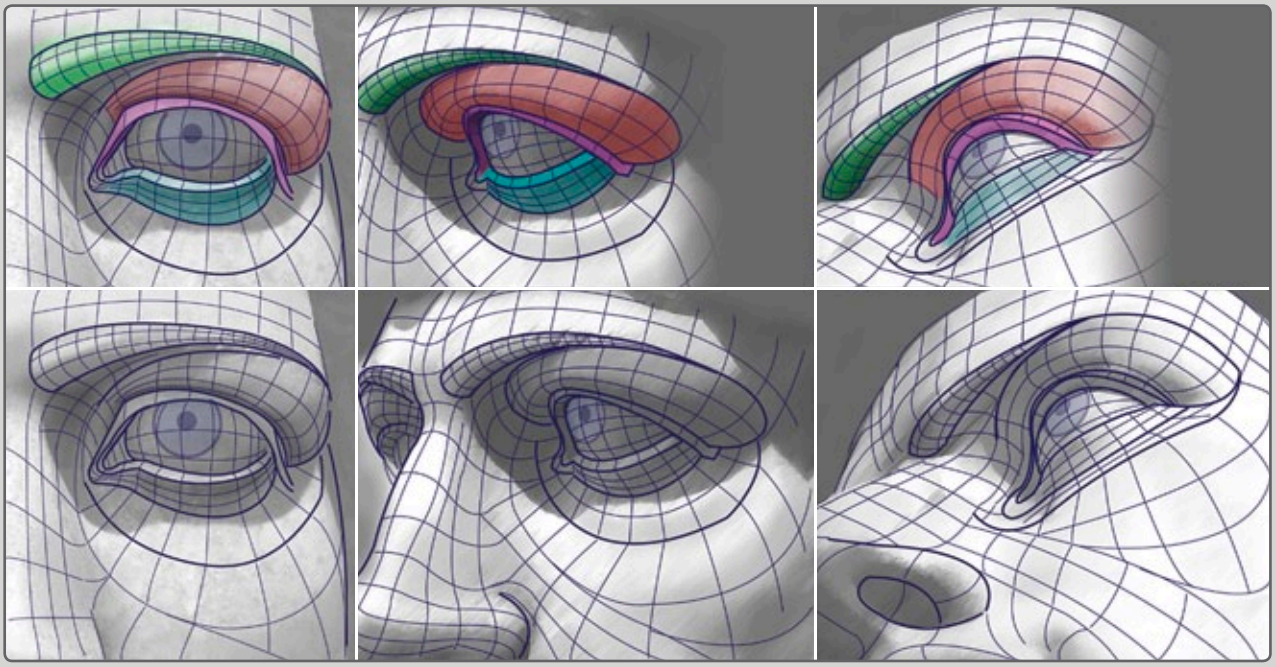
EYE

WHAT MAKES A FACE LOOK FLAT?







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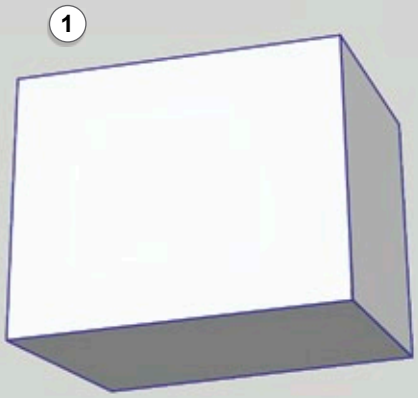
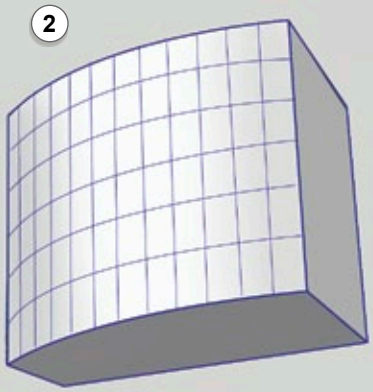
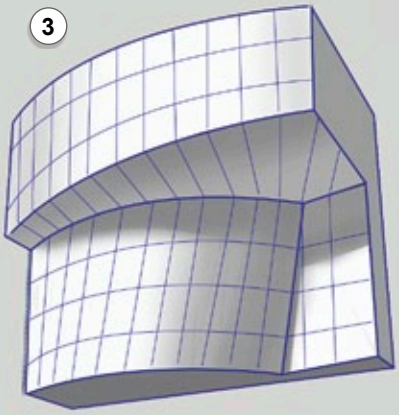
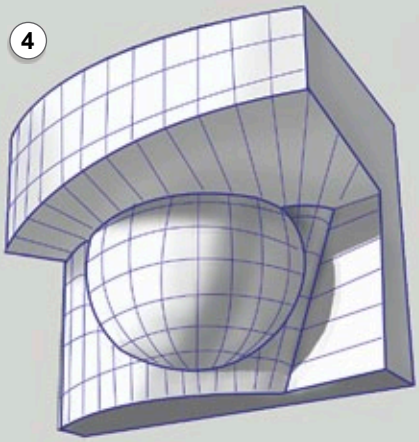
BLOCKING-OUT A CLASSICAL EYE

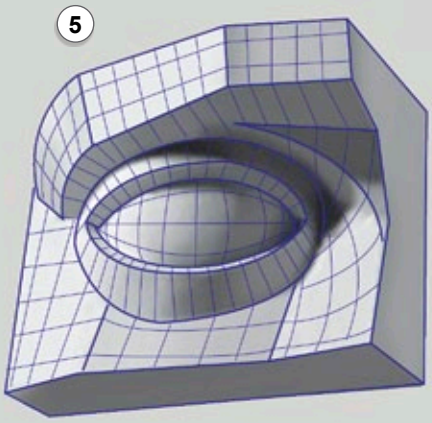
(STEP-BY-STEP)

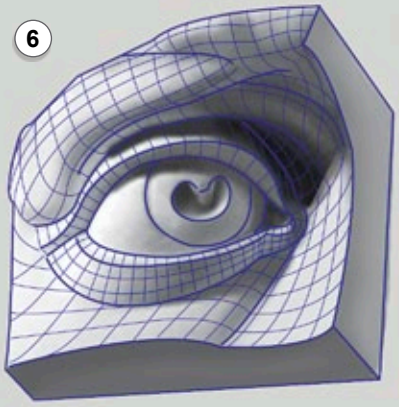












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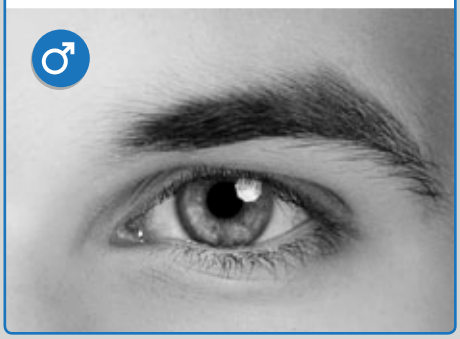
EYES COME IN A VARIETY OF SHAPES

ADULT FEMALE

ADULT MALE



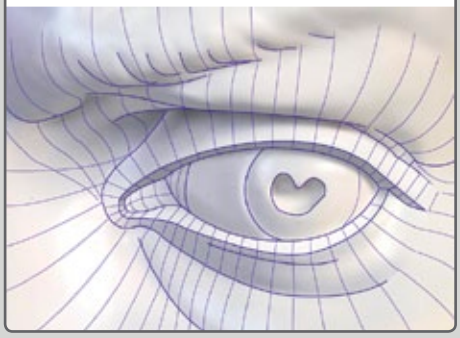
BABY

CHILD

ASIAN

BLACK

CLASSICAL SCULPTURE



SENIOR

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EYE MOVEMENTS

(EXPRESSIONS)

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EYE MOVEMENTS

(EXPRESSIONS)

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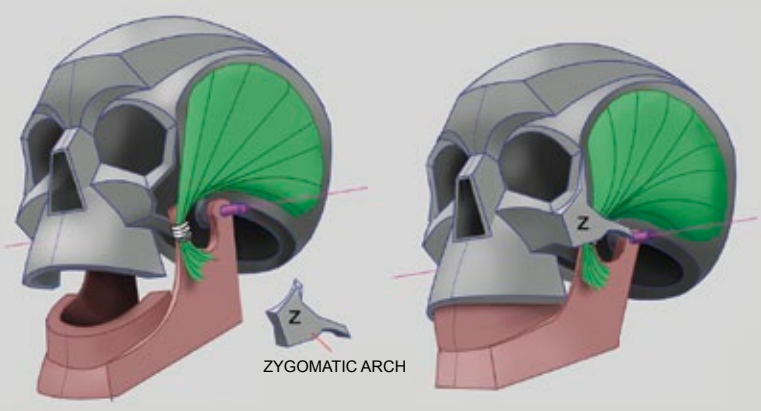
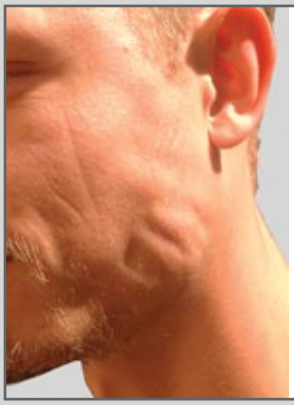
WHAT STRONG JAWS YOU HAVE!

TEMPORALIS MUSCLE – HELPS TO CLOSE THE MOUTH AND KEEP IT SHUT!

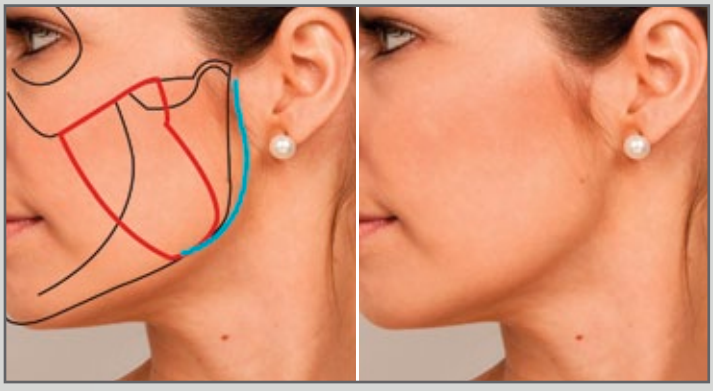


THE CHEWING MUSCLE (MASSETER MUSCLE).



IT IS THE PRIMARY CHEWING MUSCLE AND PULLS THE JAWS CLOSED. ITS OUTER PORTION ORIGINATES FROM THE ZYGOMATIC ARCH AND INSERTS ON THE SURFACE OF THE RAMUS OF THE MANDIBLE.

PAROTID GLAND (SALIVARY GLAND) ALSO PLAYS IMPORTANT ROLE IN SHAPING THE JAWLINE AND FACE.



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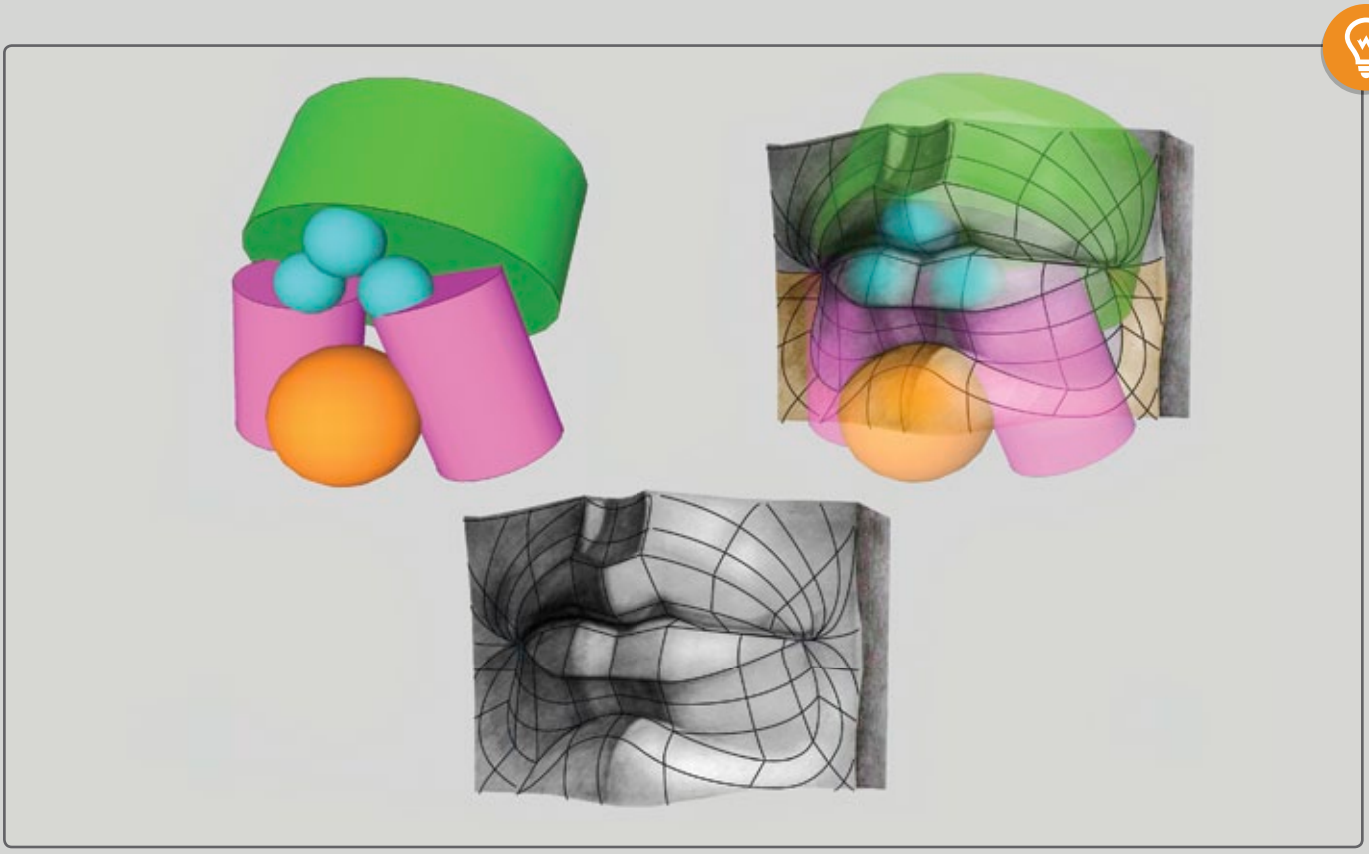
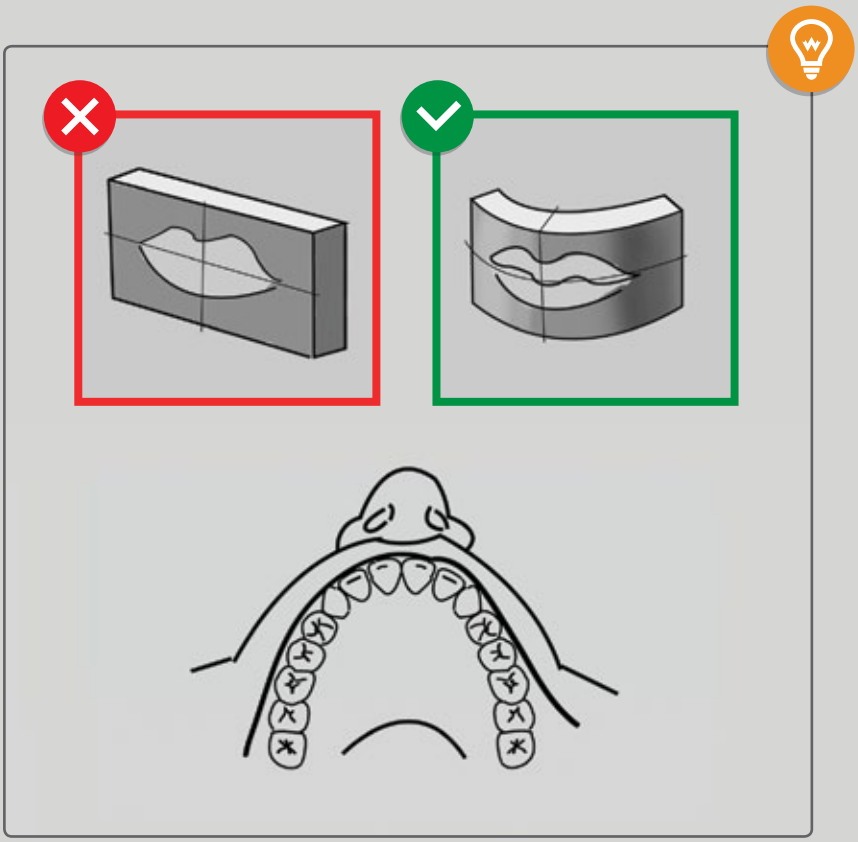
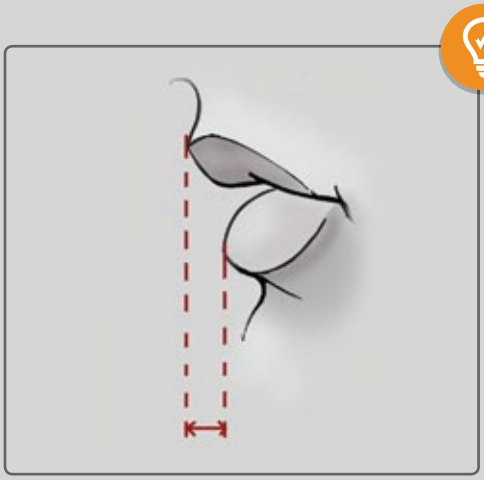
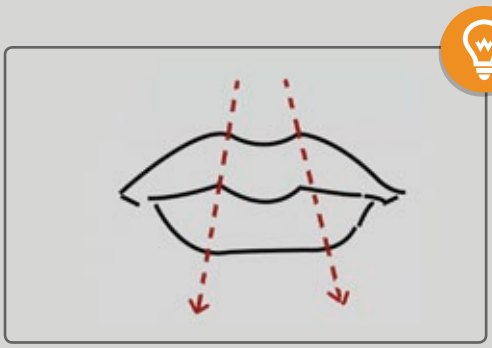
UNDERSTANDING MOUTH CURVATURE









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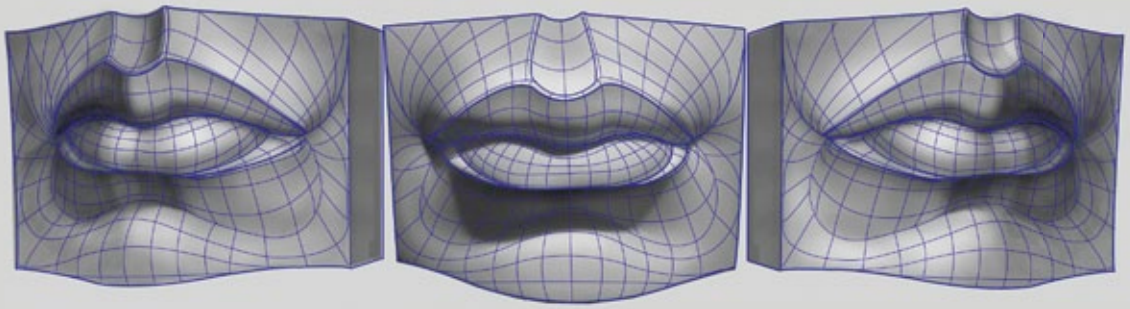
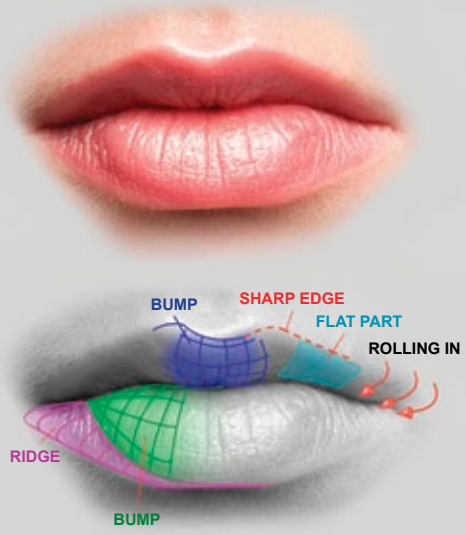
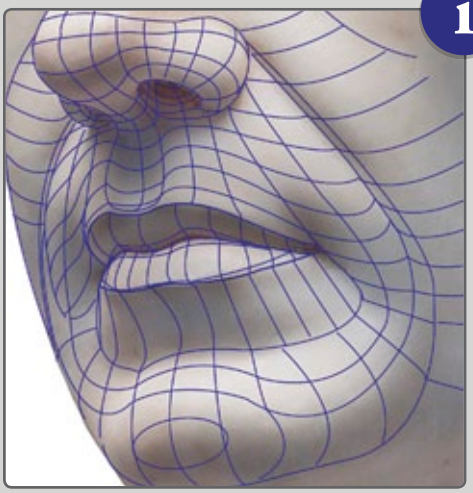
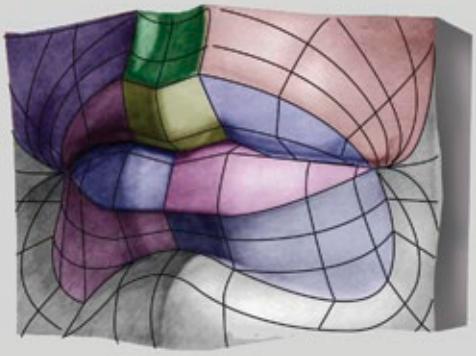
SHAPE OF STILL LIPS









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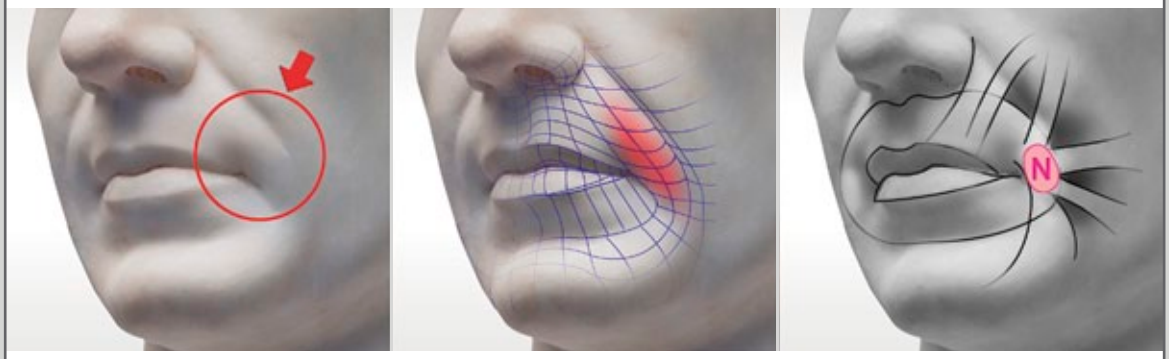
MOUTH

MOUTH EXPRESSIONS – IT'S ALL ABOUT PULLING AND SQUEEZING.

WHAT IS THIS BUMP?



IT IS CALLED THE "NODE".

IT IS THE POINT WHERE SEVERAL FACIAL MUSCLES CONNECT TO THE CORNER OF THE MOUTH.

WHEN YOU SCULPT EXPRESSIONS, REMEMBER BONY LANDMARKS! BY PULLING IN DIFFERENT DIRECTIONS, THESE MUSCLES CREATE THE EXPRESSIONS, WHILE SKULL REMAINS THE SAME.

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MOUTH EXPRESSIONS

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MORE MOUTH EXPRESSIONS

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EVEN MORE MOUTH EXPRESSIONS

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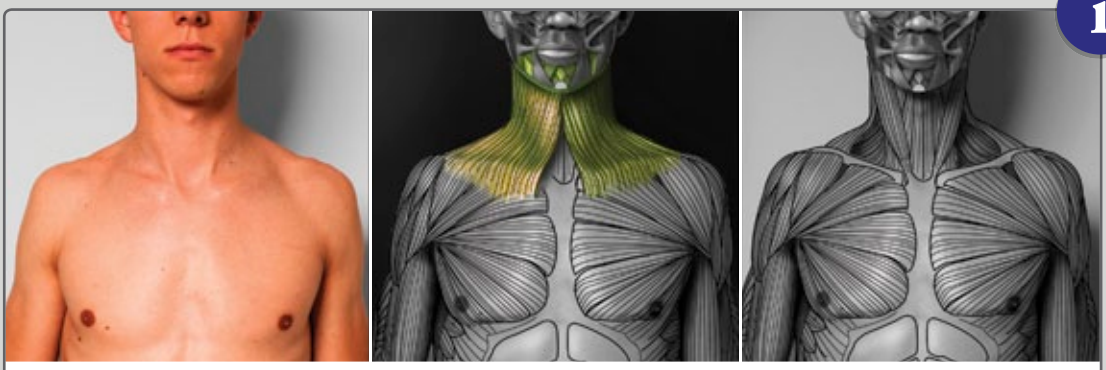
PLATYSMA MUSCLE



THE PLATYSMA IS A BROAD, THIN LAYER OF MUSCLE THAT IS SITUATED ON EACH SIDE OF THE NECK IMMEDIATELY UNDER THE SUPERFICIAL FASCIA.

THE PLATYSMA BELONGS TO THE GROUP OF FACIAL MUSCLES AND DRAWS THE CORNERS OF THE LOWER LIP AND MOUTH TO THE SIDES AND DOWNWARD. WHEN FLEXED FORCEFULLY, IT EXPANDS THE NECK AND DRAWS ITS SKIN UPWARD.

WEAKNESS OF THIS MUSCLE IS OFTEN THE MAJOR FACTOR IN CAUSING SAGGING UNDER THE CHIN IN OLDER PEOPLE (THIS IS NOT DUE TO AGING SKIN OR FROM FAT ACCUMULATION).

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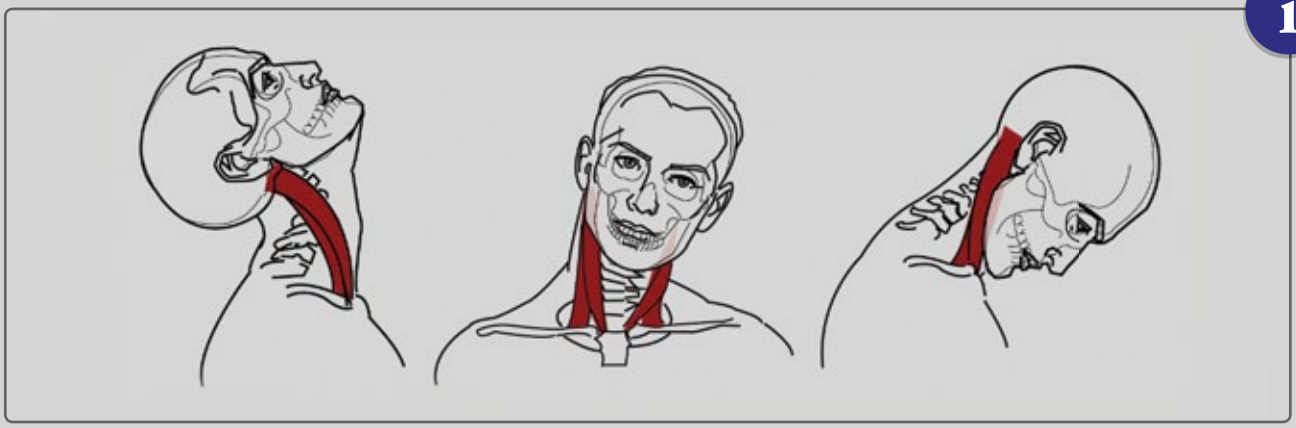
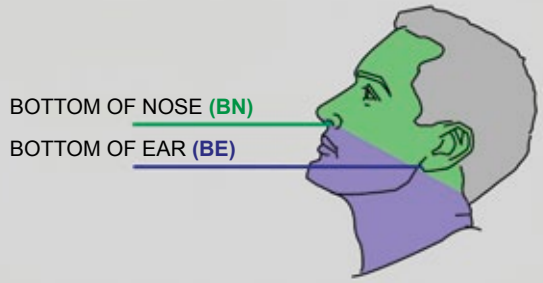
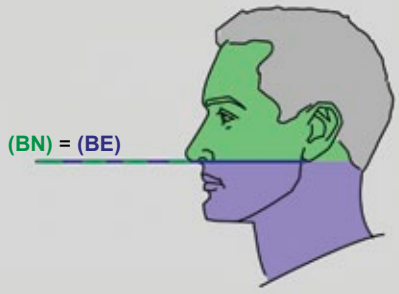
STERNOCLEIDOMASTOID MUSCLE IN ACTION



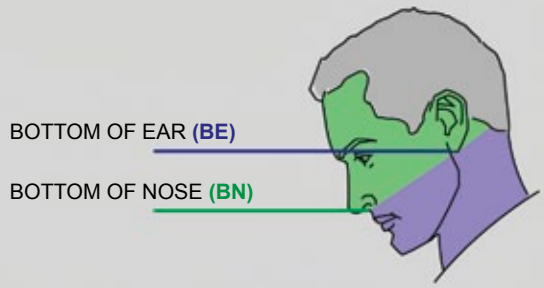
HEAD UP (BN) ABOVE (BE)



HEAD STRAIGHT (BN) LINED UP WITH (BE)

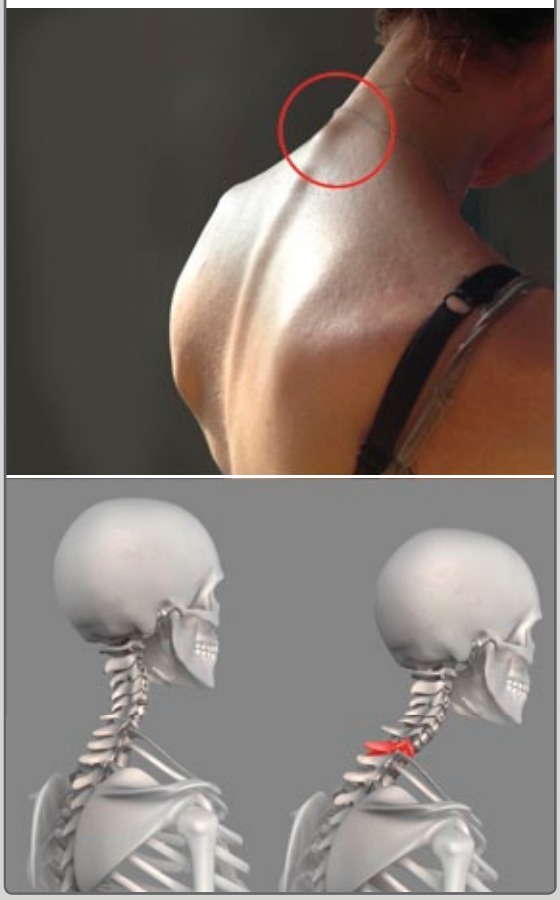


HEAD DOWN (BE) ABOVE (BN)



7TH CERVICAL VERTEBRAL BONE
(WHERE THE NECK MEETS THE SHOULDERS).

WHEN HEAD IS BENT FORWARD, YOU CAN SEE PROMINENT VERTEBRA AT THE TOP OF THE SPINE PROTRUDING OUTWARD SLIGHTLY.



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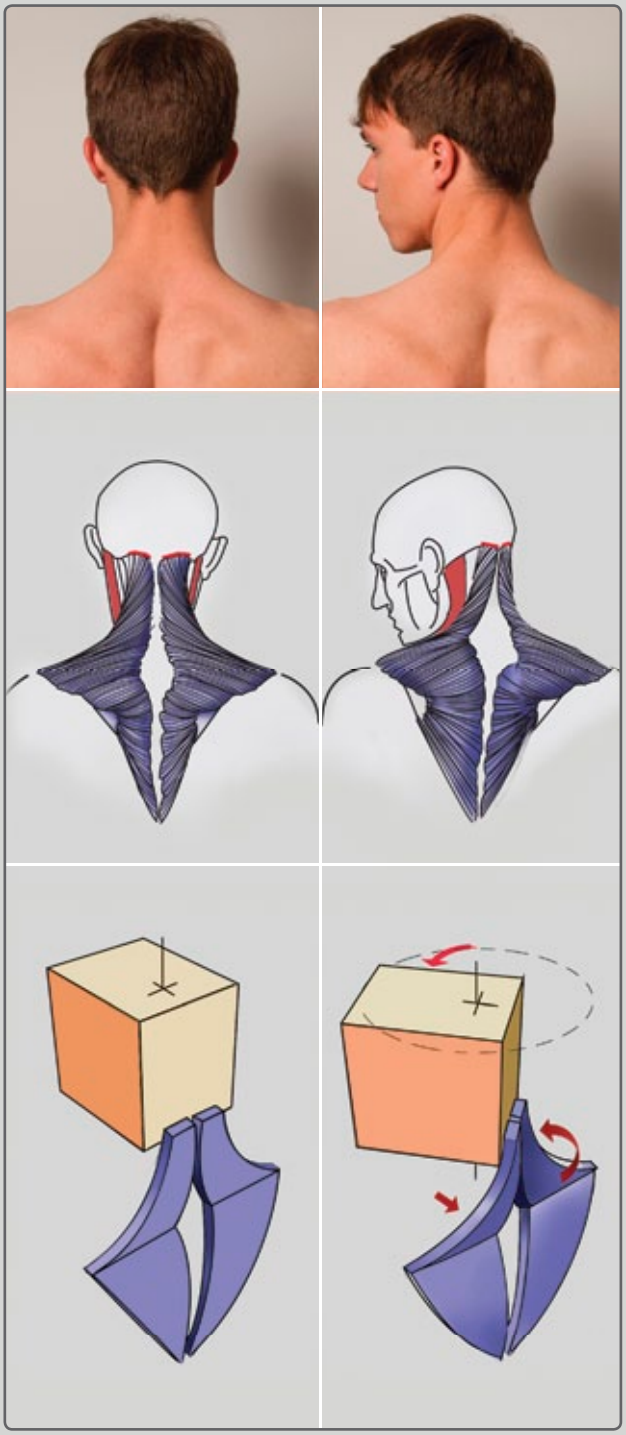
TRAPEZIUS MUSCLE, STERNOCLEIDOMASTOID MUSCLE



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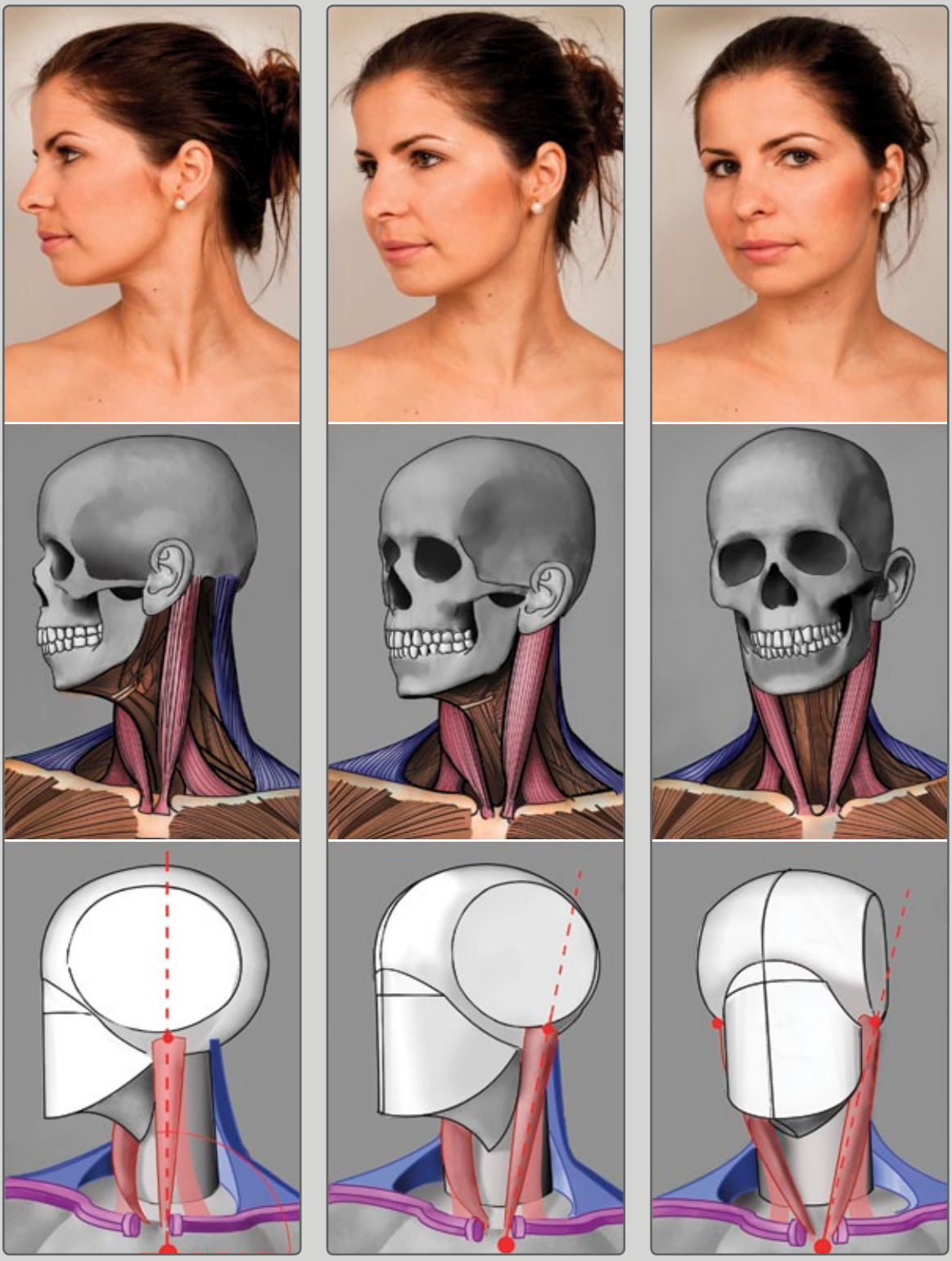
MAJOR NECK MUSCLES (TRAPEZIUS AND STERNOCLEIDOMASTOID)



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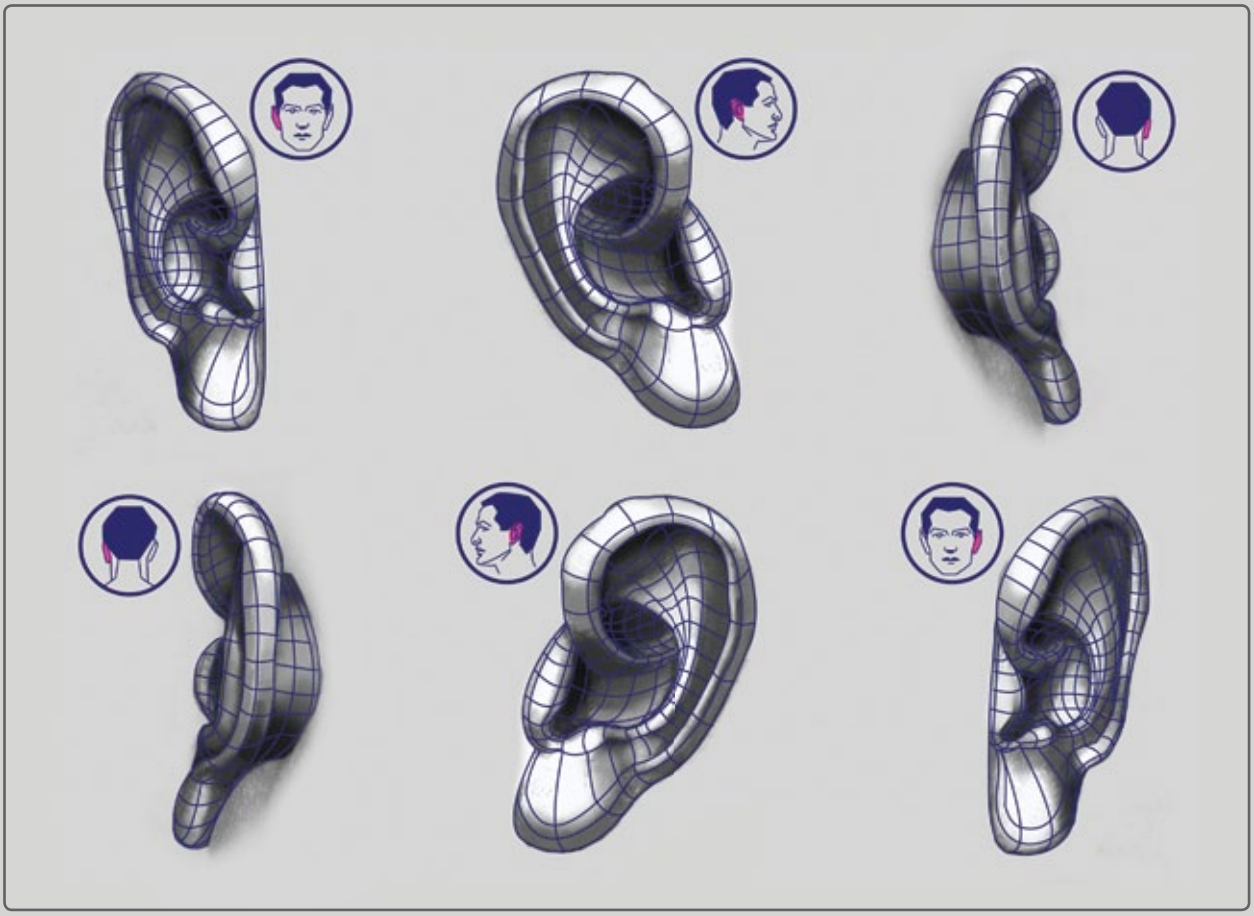
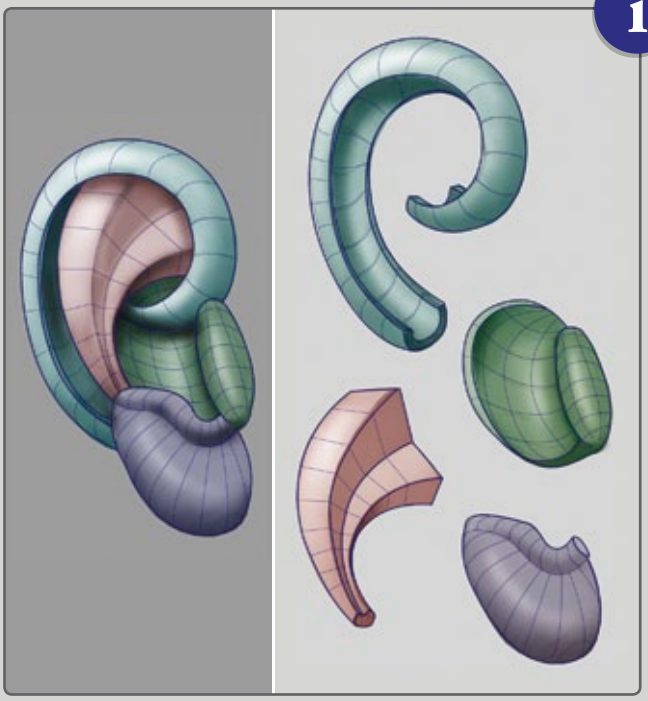
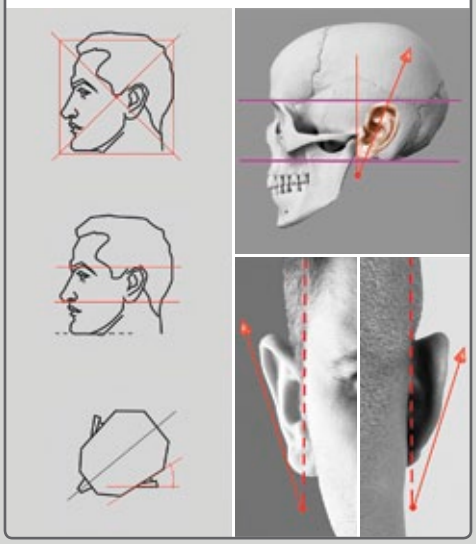
EAR





LOCATION & ORIENTATION



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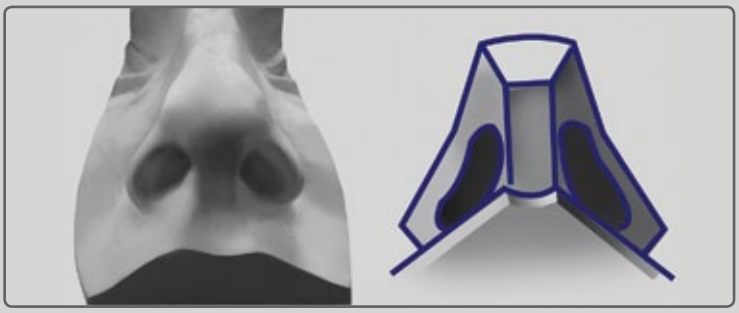
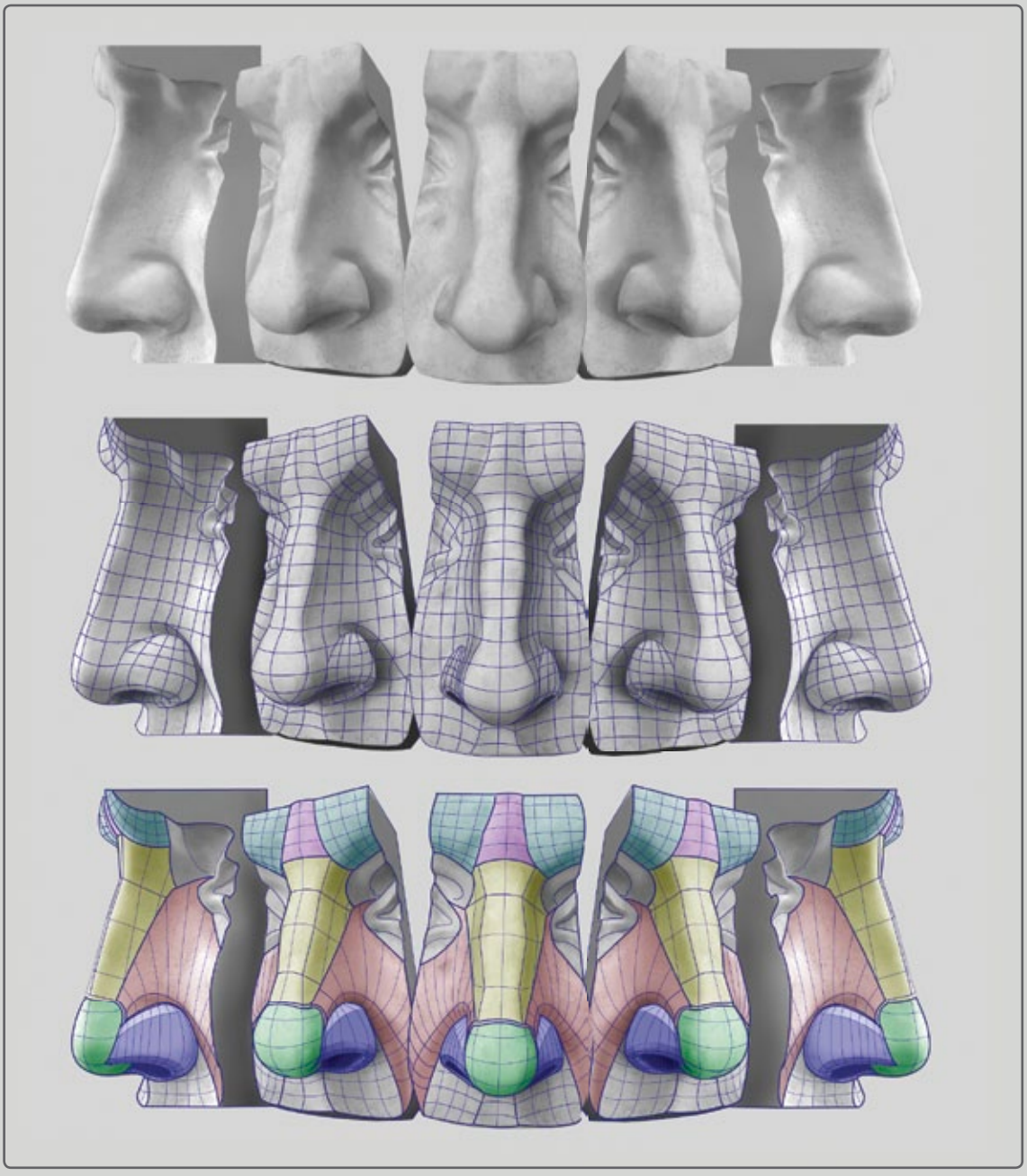
CLASSICAL NOSE





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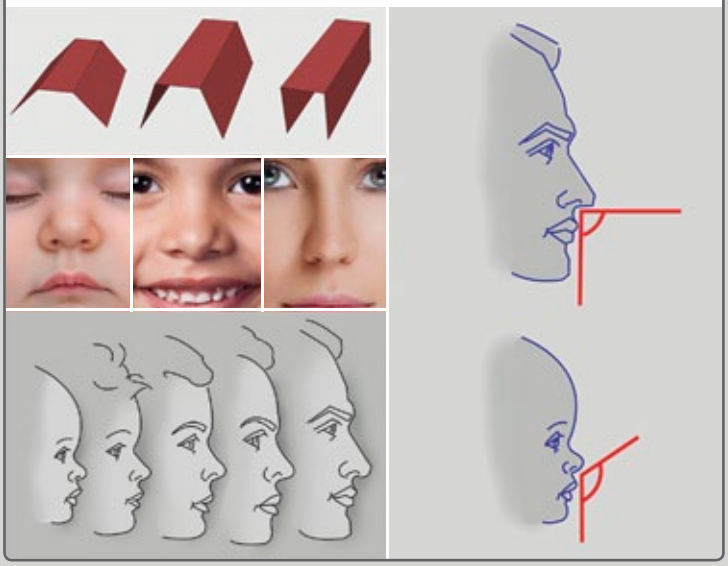
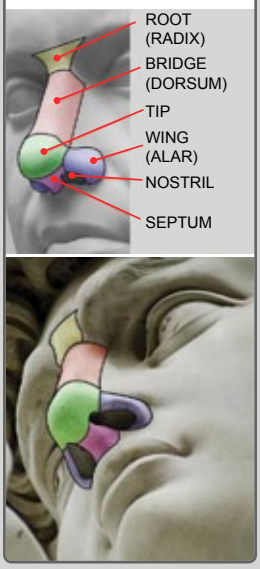
ALL ABOUT NOSES

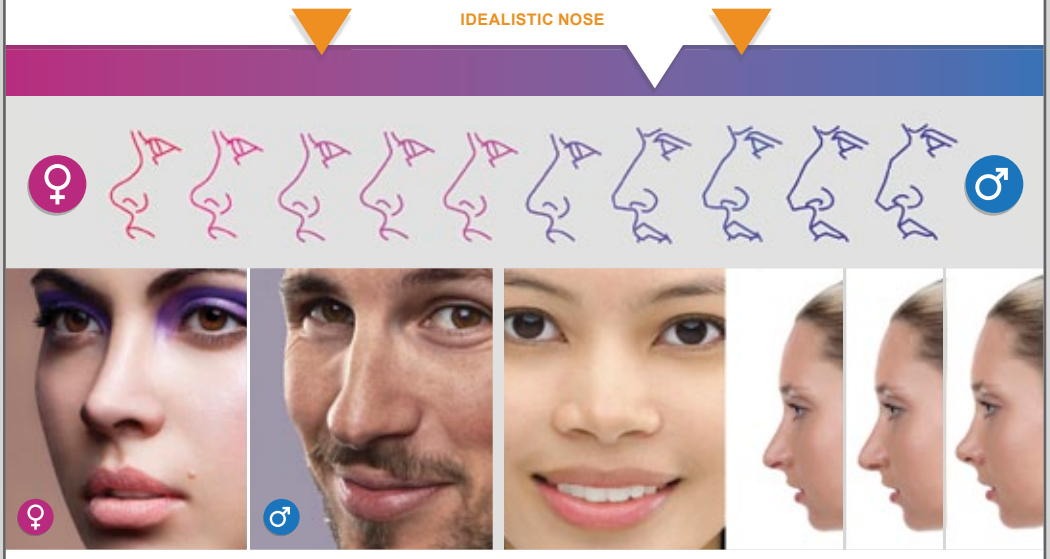
NOSES CHANGE WITH AGE



PARTS OF A NOSE



FEMALE VS. MALE NOSE



TIPPING UP THE POINT OF THE NOSE WILL MAKE IT LOOK CHILD-LIKE. GIVING IT A CONCAVE OR THIN BRIDGE WILL MAKE IT LOOK MORE FEMININE!

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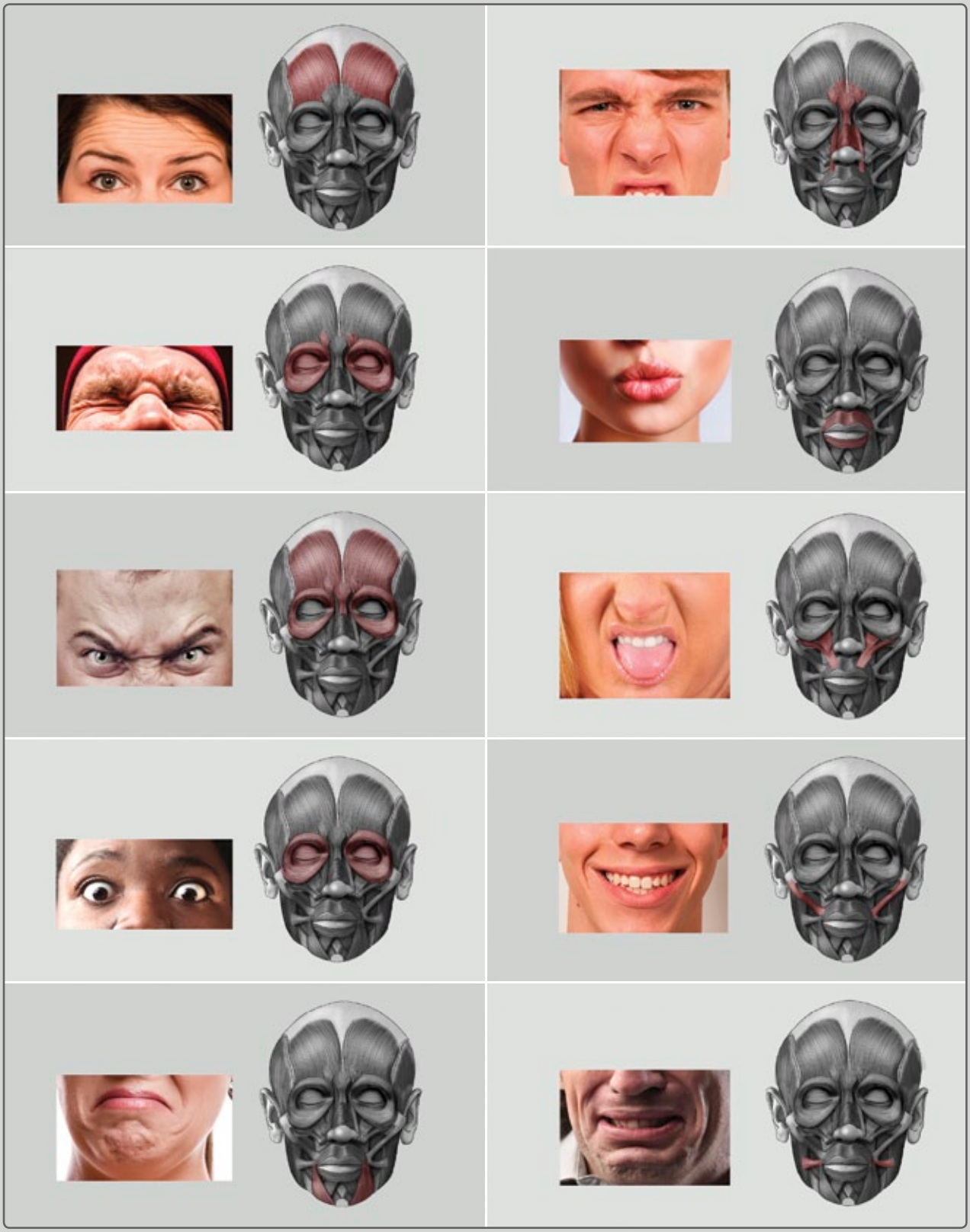
FUNCTIONS OF FACIAL MUSCLES



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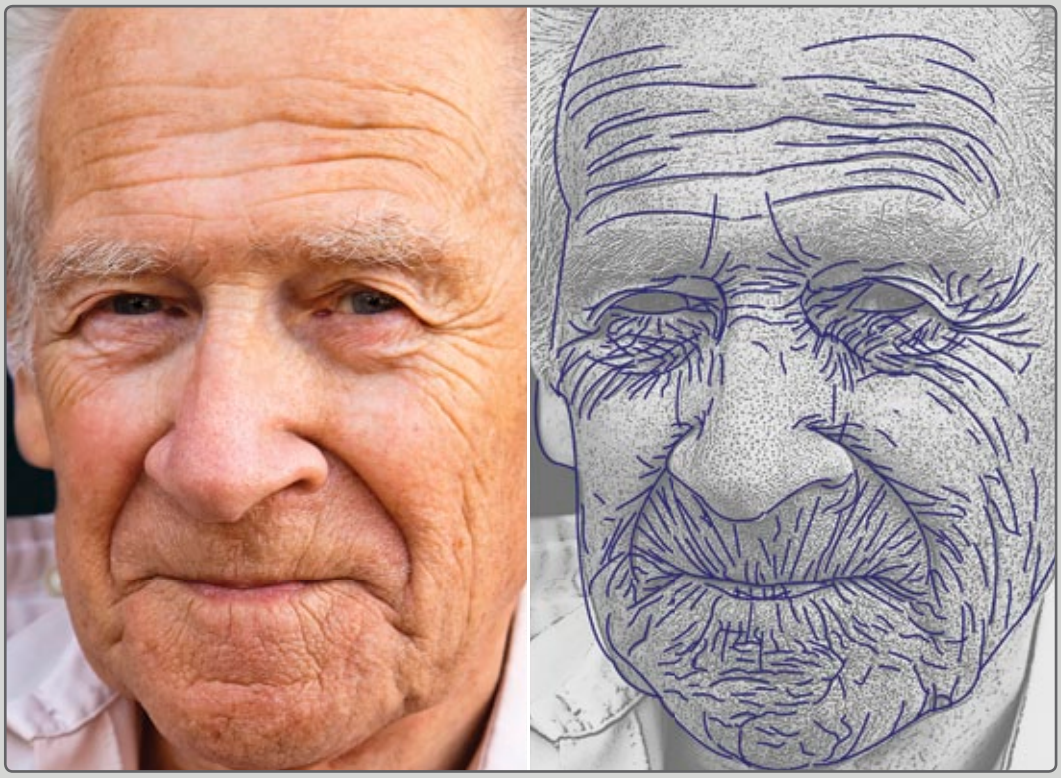
DYNAMIC WRINKLES

AGING WRINKLES



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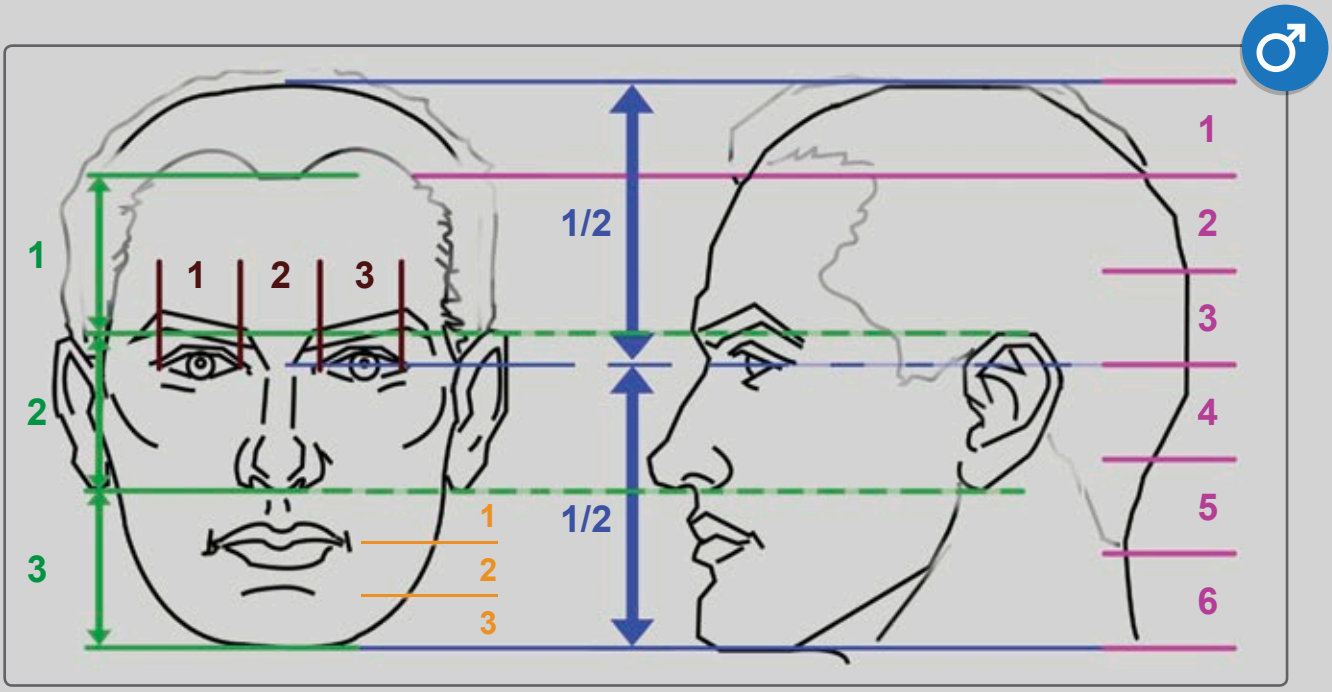
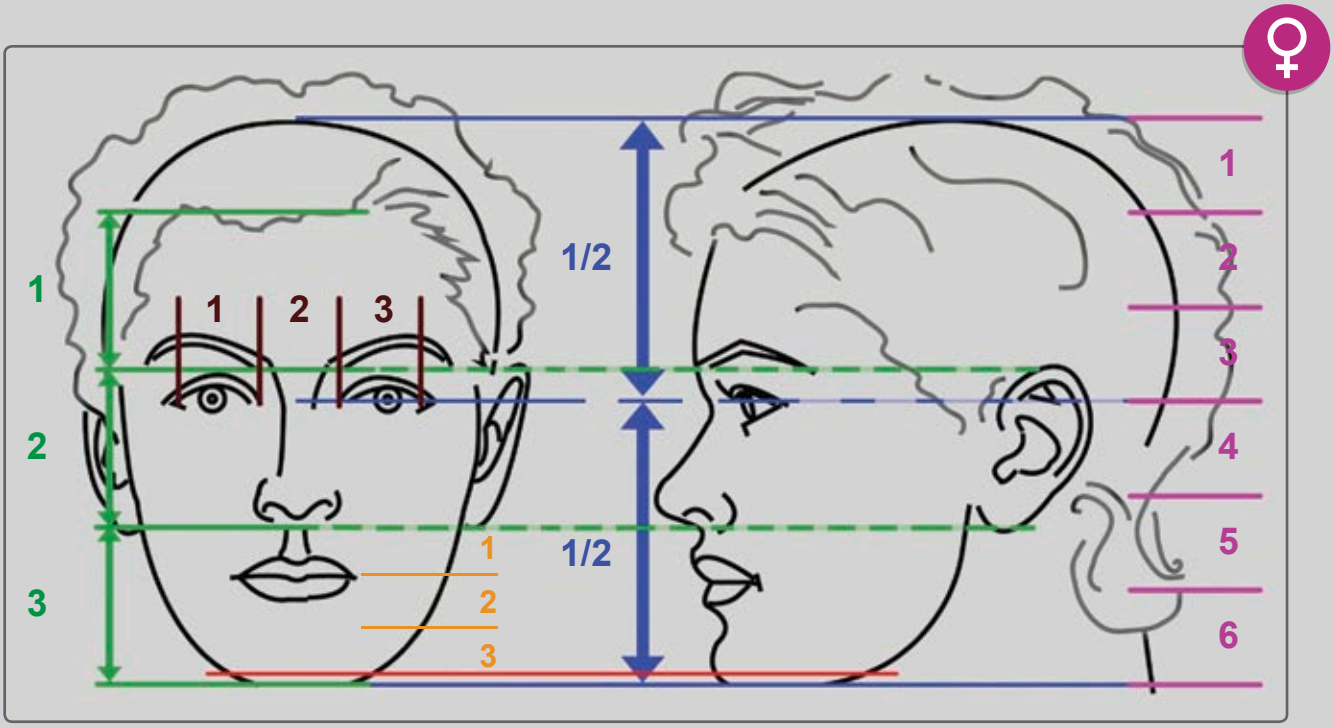
IDEALIZED PROPORTIONS OF ADULT HEADS





! FEMALES HAVE A SLIGHTLY THINNER CHIN AND JAW.

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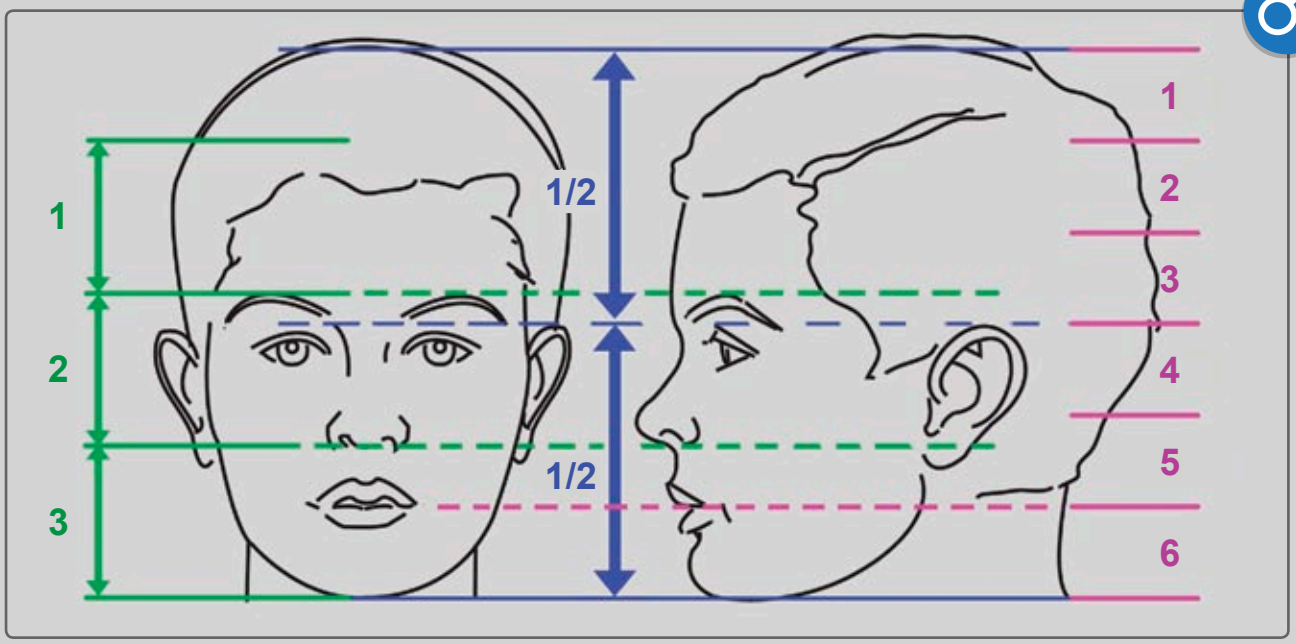
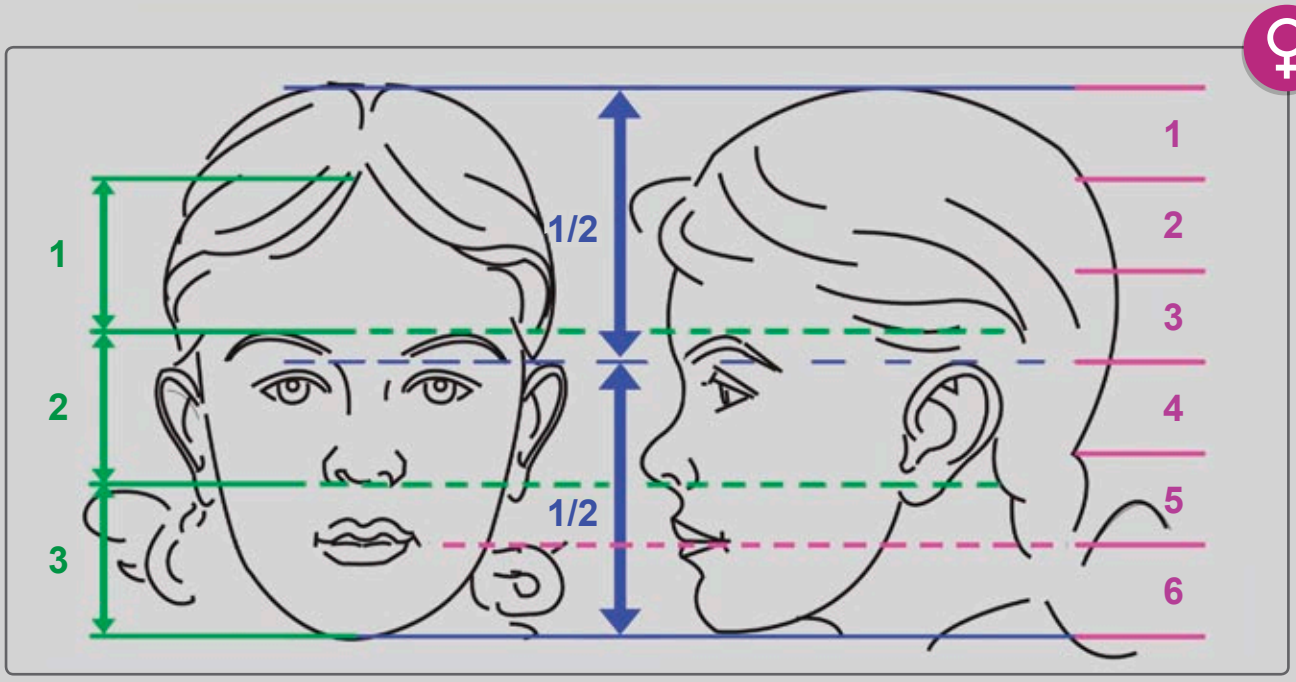
PROPORTIONS OF CHILDREN'S HEADS





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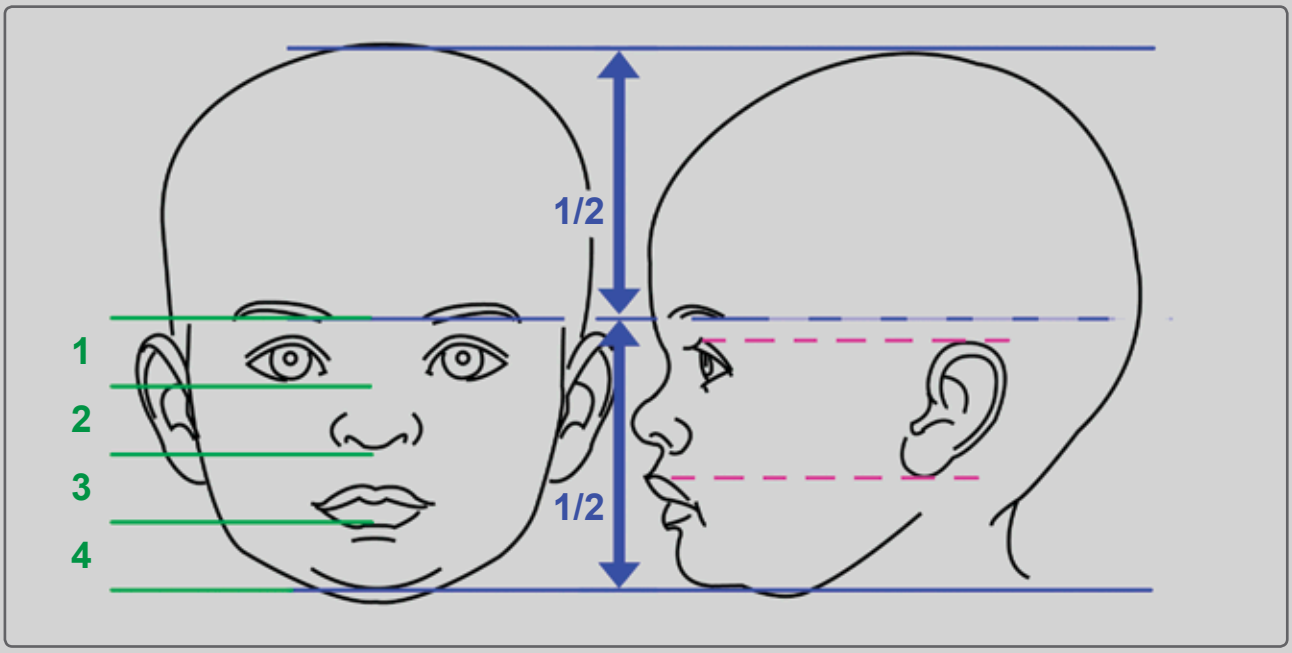
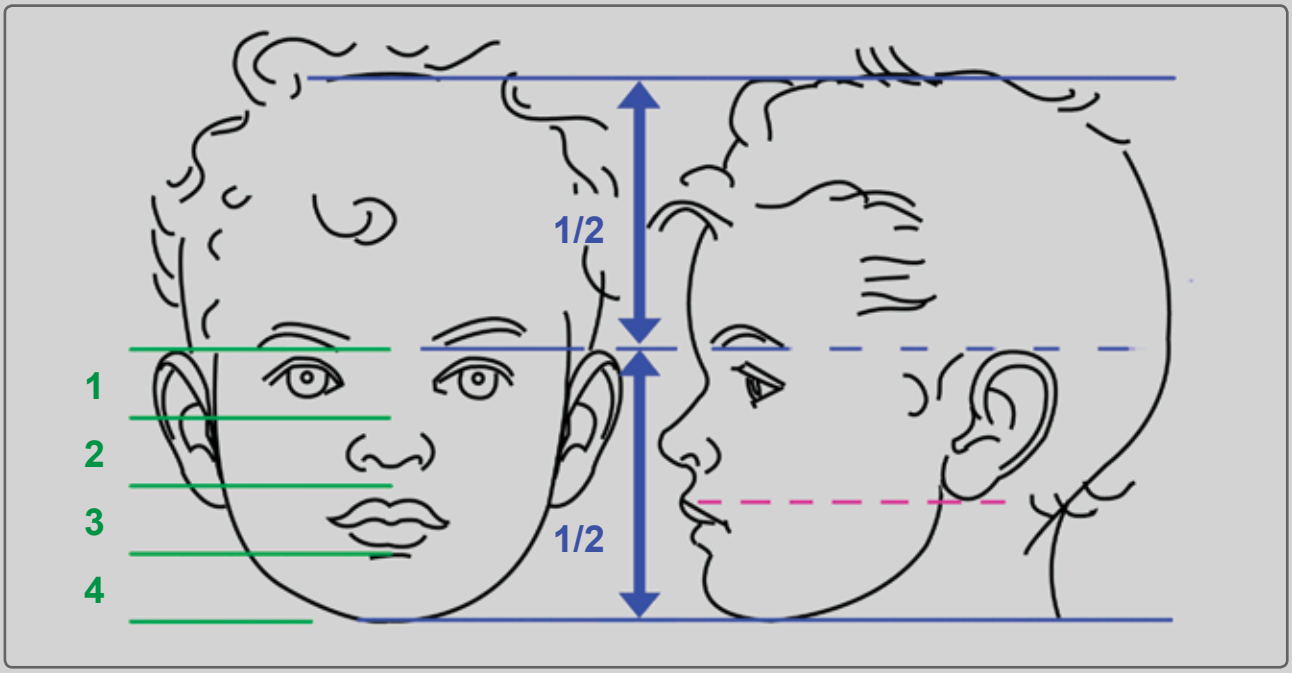
PROPORTIONS OF BABY AND TODDLER HEADS





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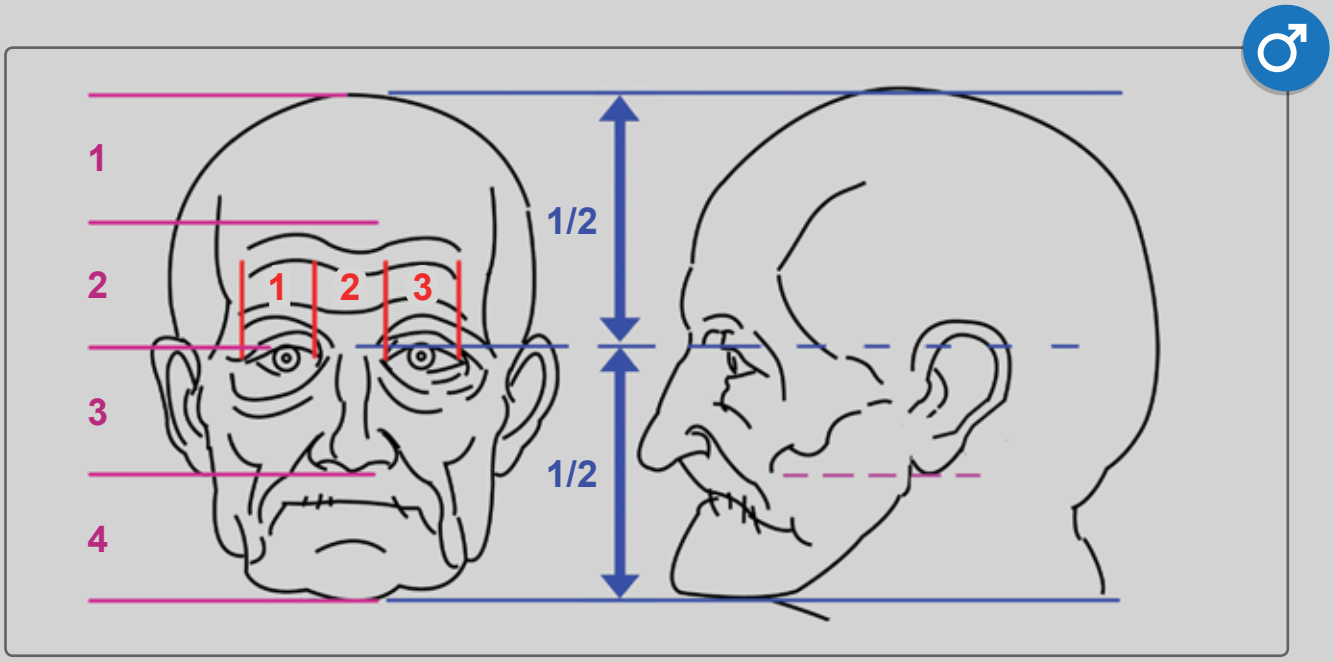
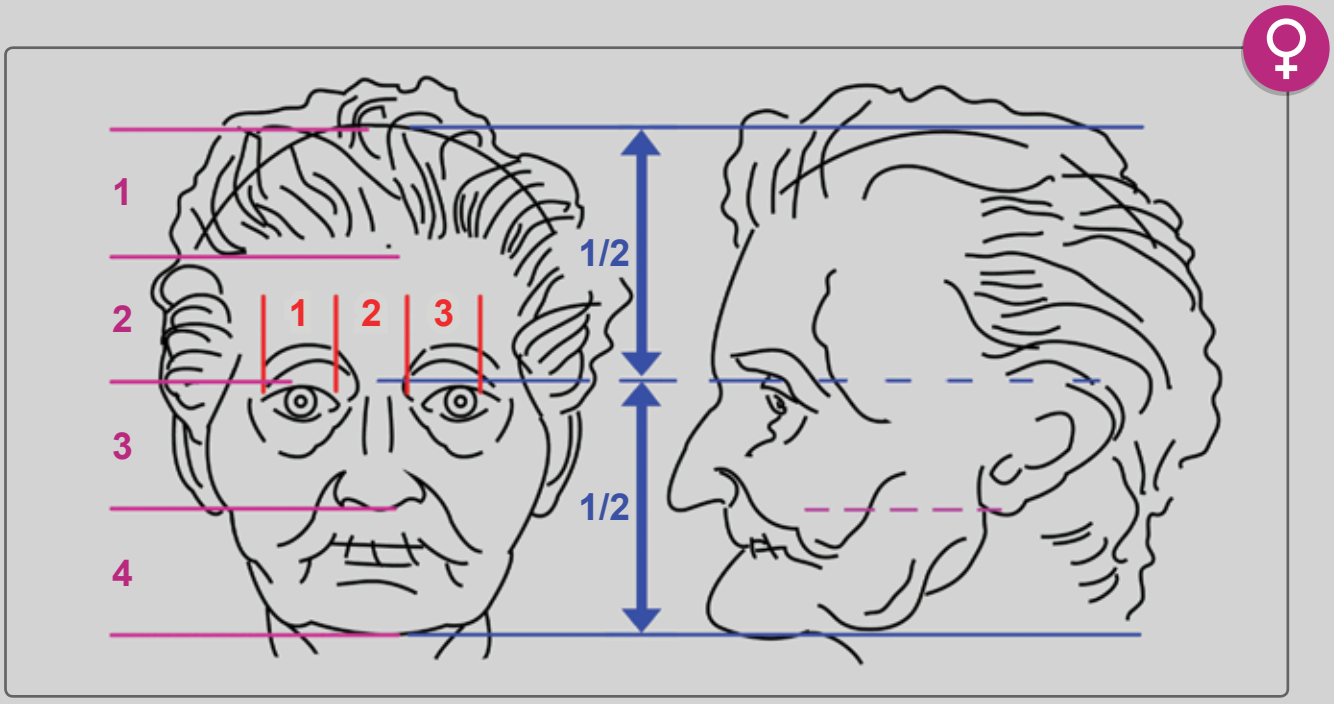
PROPORTIONS OF ELDERLY HEADS





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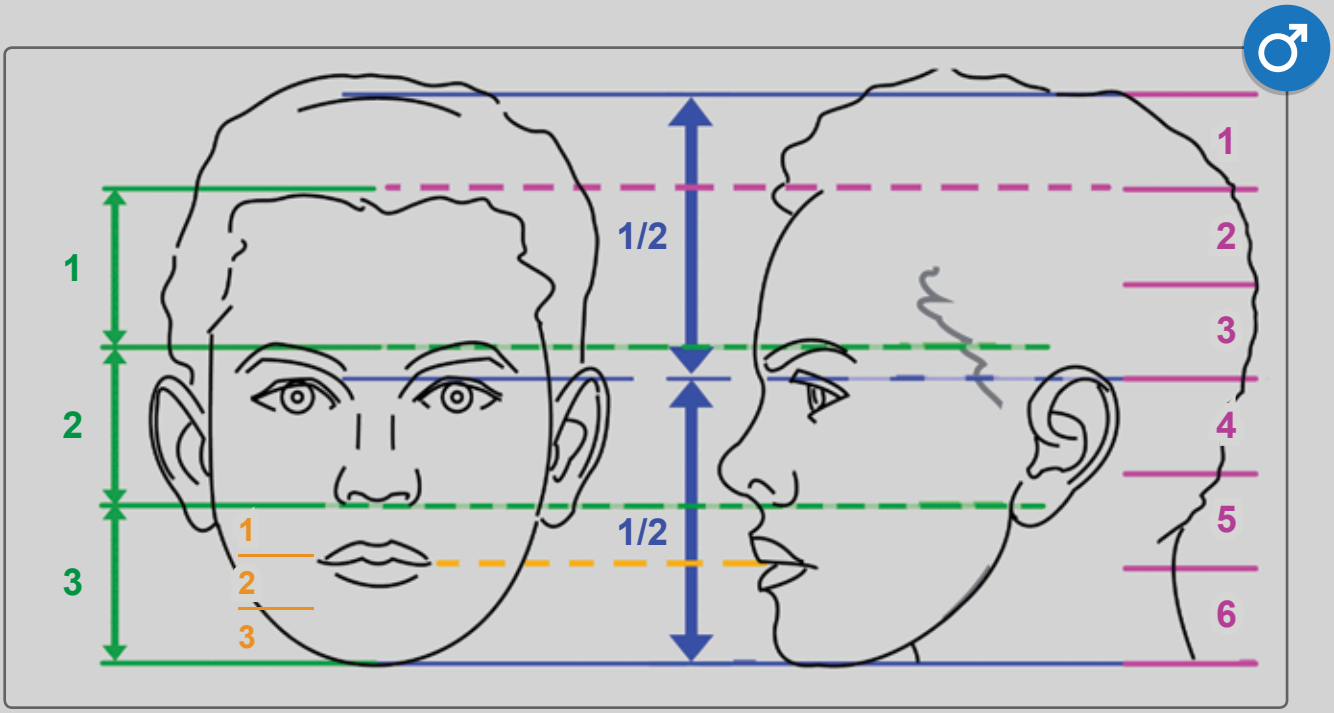
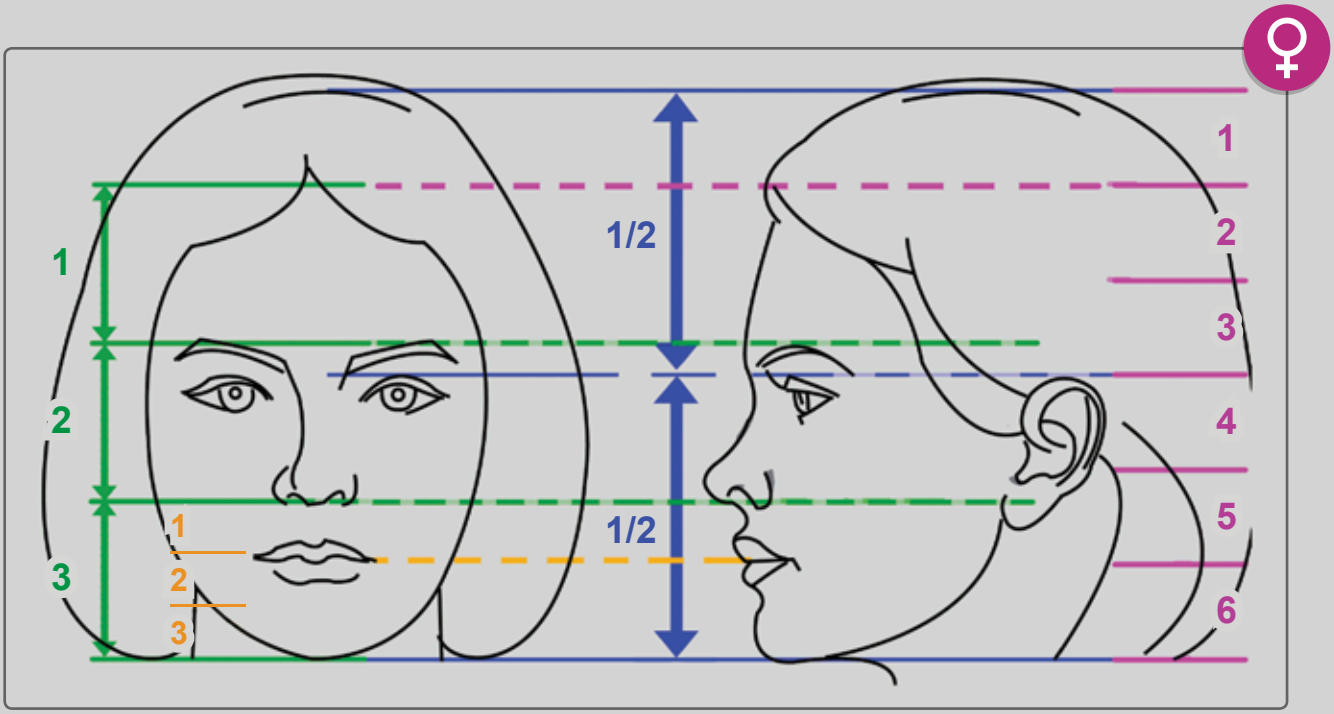
PROPORTIONS OF TEEN HEADS





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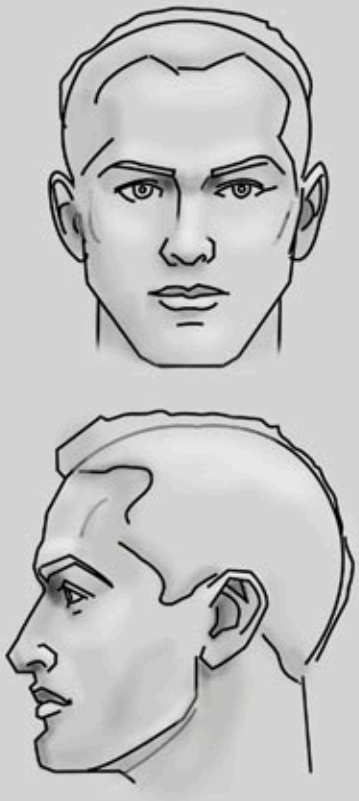
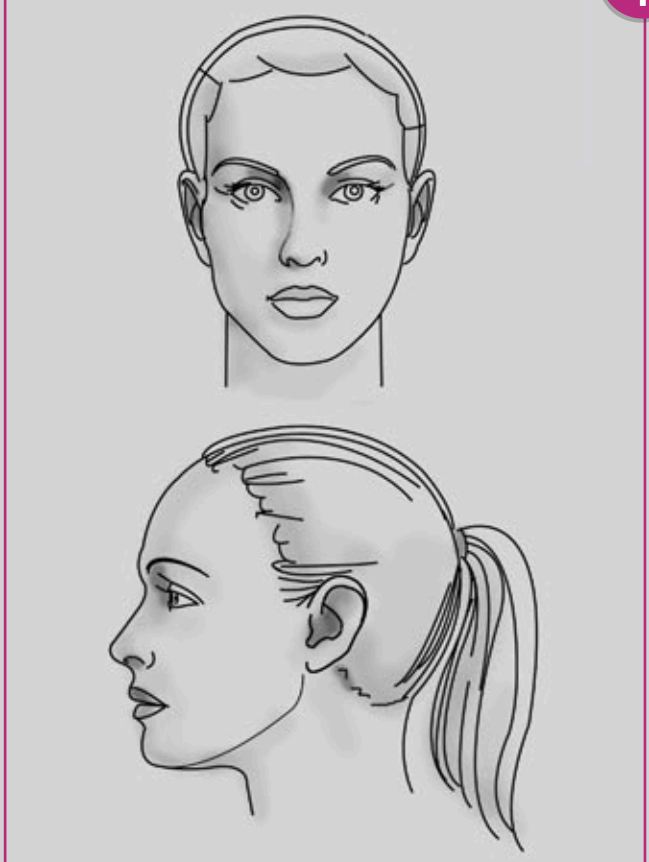
GENDER DIFFERENCES BETWEEN IDEALIZED ADULT HEADS



- DISTINCT PROTRUDING BROW RIDGES
- NOSE ROOT IS USUALLY EXPRESSED CLEARLY AND CAN BE QUITE DEEP
- PLANE OF FOREHEAD HAS A SMALL SLOPE TOWARDS THE REAR, CONTOUR OF FOREHEAD IS NOT STRAIGHT BUT SOMEWHAT WAVY
- CHEEKBONES EXPRESSED CLEARLY
- BUSHY EYEBROWS STAND OUT, AS A RULE ARE LESS ARCHED SHAPE AND SIT LOWER OVER EYES
- UPPER EYELID IS NOT PARTICULARLY DISTINGUISHED AND IS LOCATED CLOSE TO EDGE OF THE INFRAORBITAL FORAMEN
- LONGER NOSE COMPARED TO A FEMALE
- UNDERLYING THE NOSE IS A CLEARLY VISIBLE BONE-SKELETAL STRUCTURE, IT IS USUALLY LARGE. FORM IS ALMOST STRAIGHT OR SLIGHTLY CONVEX.
- NOSE IS THICK AND BROAD
- BASE OF NOSE LIES ON A HORIZONTAL PLANE
- TIP OF NOSE IS LARGE AND ROUNDED
- FOLD CONTOUR OF UPPER LIP IS SLIGHTLY CONVEX
- CAUCASIAN MALE LIPS ARE NOT AS FULL AND PUFFY AS A FEMALE'S
- PROTRUDING CHEEKBONES
- CHIN IS MASSIVE, CLEARLY DEFINED, OFTEN DIMPLED
- LOWER JAW'S WIDEST CORNERS ARE MARKED CLEARLY AND SOMEWHAT SHIFTED LATERALLY (DUE TO DEVELOPED CHEWING MUSCLES)



- CLEARLY EXPRESSED EYEBROWS
- SMALLER NOSE ANGLE
- MORE VERTICAL, PROMINENT AND ROUNDER PLANE OF FOREHEAD
- PROTRUDING CHEEKBONES
- THIN EYEBROWS WITH AN ARCHED FORM, USUALLY MUCH HIGHER THAN THE EYES OF MALES
- LARGER UPPER EYELID
- DEEPENING OF ROOT OF THE NOSE IS ALMOST UNNOTICEABLE
- STRUCTURE OF NOSE IS THIN AND USUALLY STRAIGHT OR SLIGHTLY CONCAVE
- NOSE, THIN WELL-DEFINED
- BASE OF NOSE ON PLANE, TILTED SOMEWHAT UPWARD
- TIP OF THE NOSE CLEARLY EXPRESSED (DUE TO CARTILAGE STRUCTURE)
- UPPER LIP OFTEN HAS A SLIGHT INDENTATION CENTERED UNDER THE NOSE CALLED THE PHILTRUM
- LIPS ARE SMALL, OFTEN FULL AND POUTY
- CHEEKS ARE SMOOTH, AND SOMETIMES PUBESCENT, FLAT OR SLIGHTLY CONVEX
- A SMALL CHIN WITH A ROUND SHAPE
- LOWER JAW IS MARKEDLY DEFINED, WITH A ROUNDED ANGLE
- IN RELATION TO THE SIZE OF HEAD AND SHOULDERS, WOMEN HAVE A LONG, SLENDER NECK

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EMOTION – EXCITEMENT

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EMOTION – HAPPINESS

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EMOTION – ANGER

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EMOTION – SURPRISE

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EMOTION – DISGUST

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EMOTION – FEAR

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EMOTION – INTEREST

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EMOTION – WORRY

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ETHNICITIES

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BABY EMOTIONS

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SENIOR EMOTIONS

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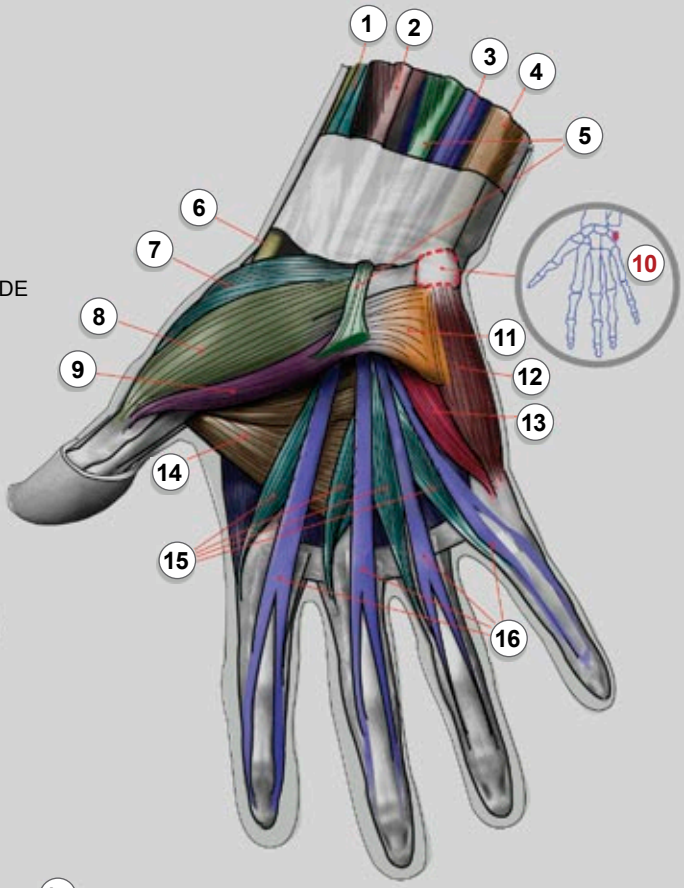
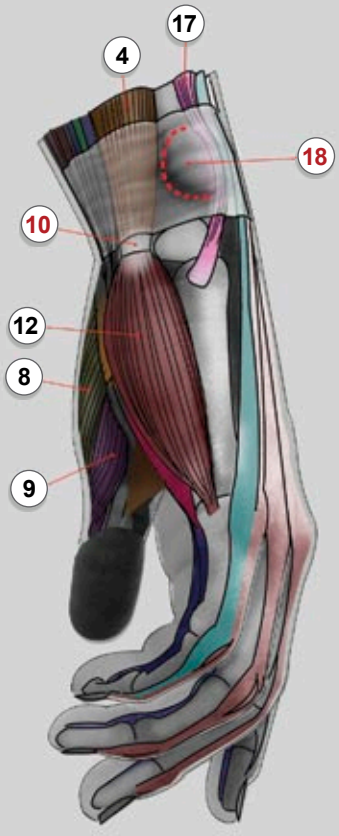
HAND AND WRIST MUSCLES

PALM SIDE



LITTLE FINGER SIDE



1	BRACHIORADIALIS
2	FLEXOR CARPI RADIALIS
3	f.d.s.*
4	FLEXOR CARPI ULNARIS
5	PALMARIS LONGUS
6	ABDUCTOR POLLICIS LONGUS
7	OPPONENS POLLICIS
8	ABDUCTOR POLLICIS BREVIS
9	FLEXOR POLLICIS BREVIS
10	**PISIFORM BONE**
11	PALMARIS BREVIS
12	ABDUCTOR DIGITI MINIMI
13	FLEXOR DIGITI MINIMI BREVIS
14	ADDUCTOR POLLICIS
15	LUMBRICALS
16	TENDONS OF f.d.s.*
17	EXTENSOR CARPI ULNARIS
18	**THE HEAD OF THE ULNA**

flexor digitorum superficialis *

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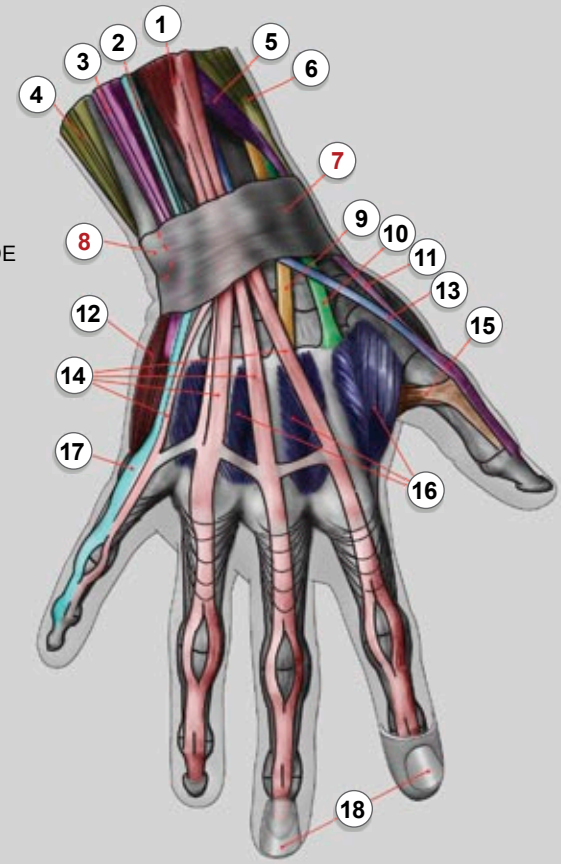
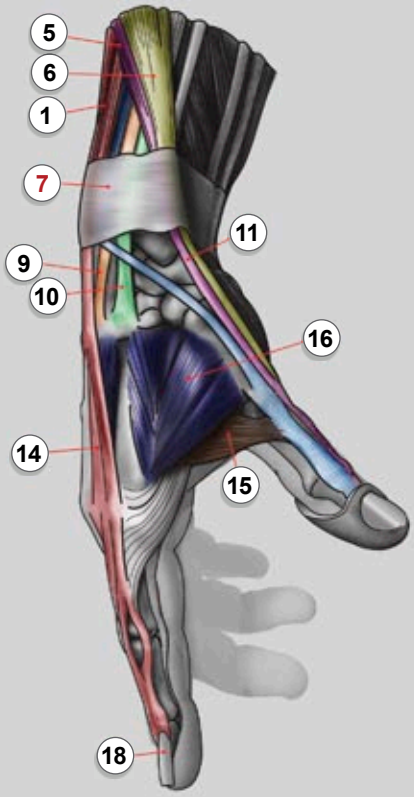
HAND AND WRIST MUSCLES

DORSAL SIDE



THUMB SIDE



1	EXTENSOR DIGITORUM
2	EXTENSOR DIGITI MINIMI
3	EXTENSOR CARPI ULNARIS
4	FLEXOR CARPI ULNARIS
5	EXTENSOR POLLICIS BREVIS
6	ABDUCTOR POLLICIS LONGUS
7	EXTENSOR RETINACULUM
8	**THE HEAD OF THE ULNA BONE**
9	TENDON OF e.c.r.b.*
10	TENDON OF e.c.r.l.**
11	TENDON OF e.p.b.***
12	ABDUCTOR DIGITI MINIMI
13	TENDON OF e.p.l.****
14	TENDONS OF e.d.*****
15	ADDUCTOR POLLICIS
16	DORSAL INTEROSSEI MUSCLES
17	EXTENSOR OF e.d.m.******
18	NAIL

extensor carpi radialis brevis *
extensor carpi radialis longus **
extensor pollicis brevis ***
extensor pollicis longus ****
extensor digitorum *****
extensor digiti minimi ******

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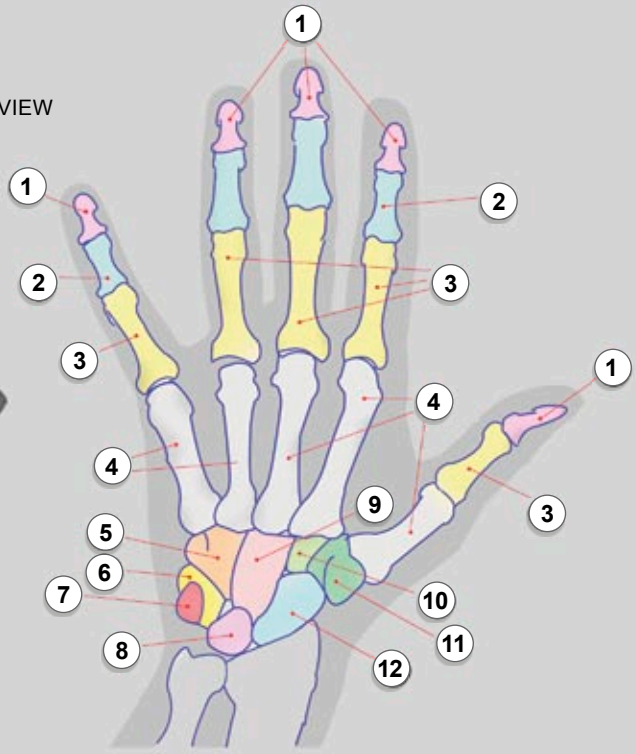
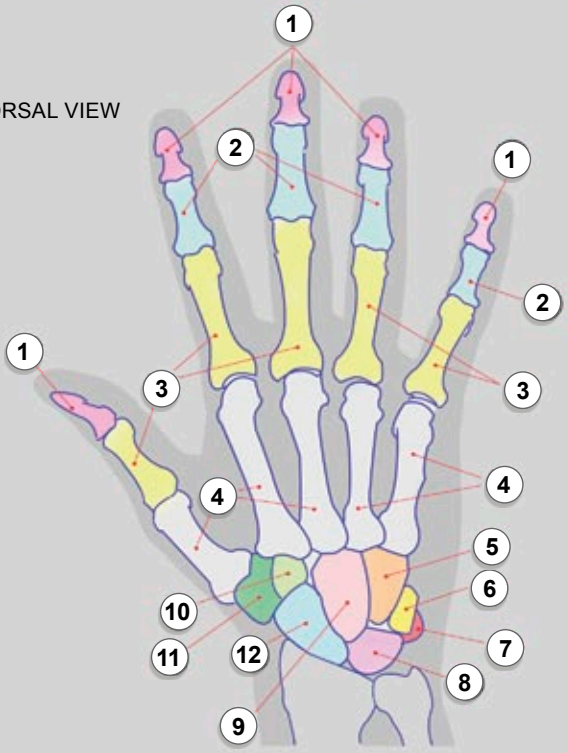
HAND AND WRIST BONES

PALMAR VIEW



DORSAL VIEW



1	DISTAL PHALANGES	4	METACARPALS	7	PISIFORM	10	TRAPEZOID
2	MIDDLE PHALANGES	5	HAMATE	8	LUNATE	11	TRAPEZIUM
3	PROXIMAL PHALANGES	6	TRIQUETRUM	9	CAPITATE	12	SCAPHOID

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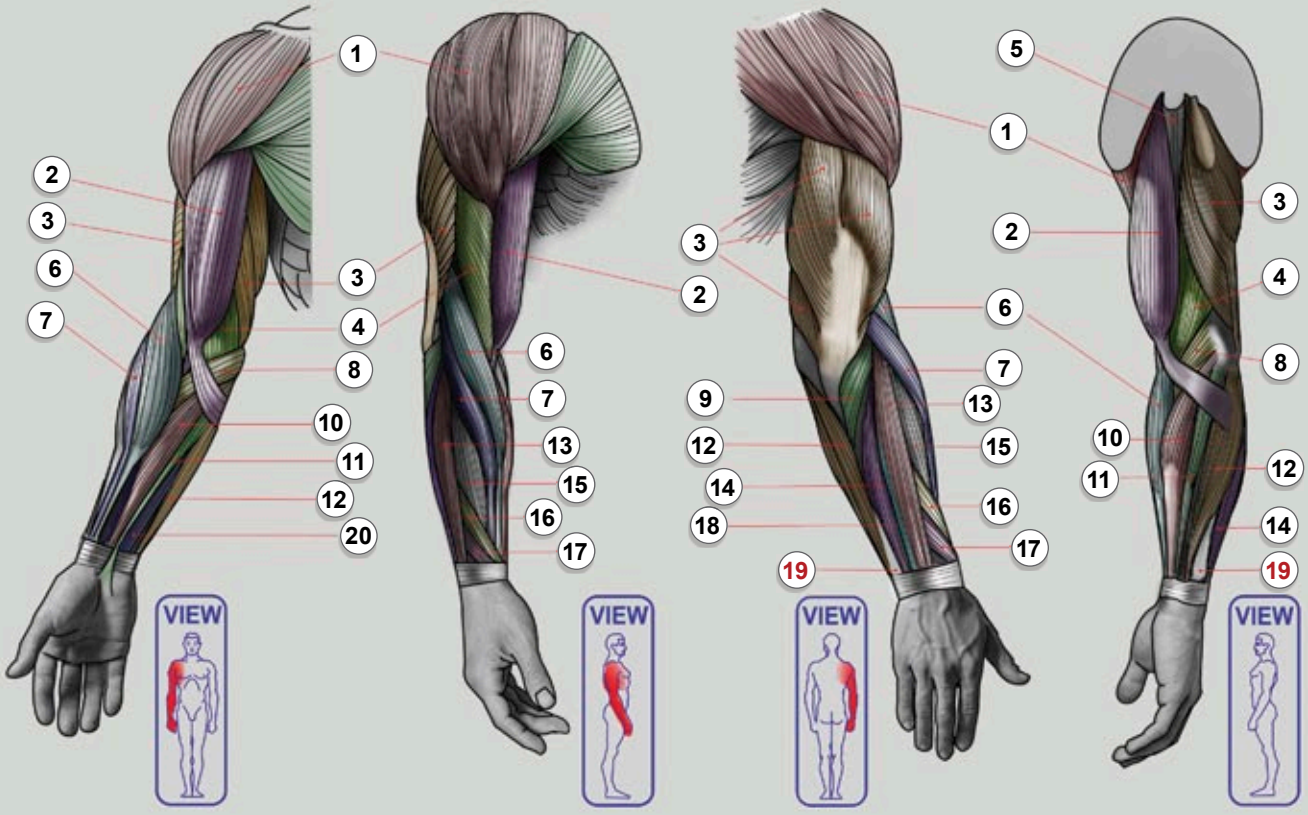
MAJOR MUSCLES OF UPPER LIMB



1	SHOULDER MUSCLE (deltoid)	11	PALMARIS LONGUS
2	BICEPS BRACHII	12	FLEXOR CARPI ULNARIS
3	TRICEPS BRACHII	13	EXTENSOR DIGITORUM
4	BRACHIALIS	14	EXTENSOR CARPI ULNARIS
5	CORACOBRACHIALIS	15	EXTENSOR CARPI RADIALIS BREVIS
6	BRACHIORADIALIS	16	ABDUCTOR POLLICIS LONGUS
7	EXTENSOR CARPI RADIALIS LONGUS	17	EXTENSOR POLLICIS BREVIS
8	PRONATOR TERES	18	EXTENSOR DIGITI MINIMI
9	ANCONEUS	19	**THE HEAD OF ULNA BONE**
10	FLEXOR CARPI RADIALIS	20	FLEXOR DIGITORUM SUPERFICIALIS

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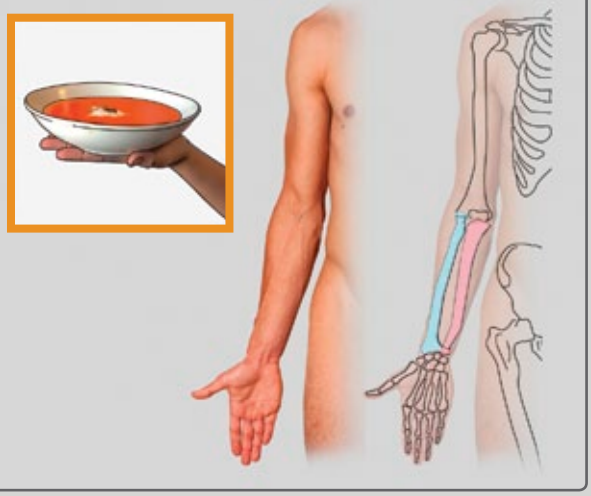
SUPINATION AND PRONATION

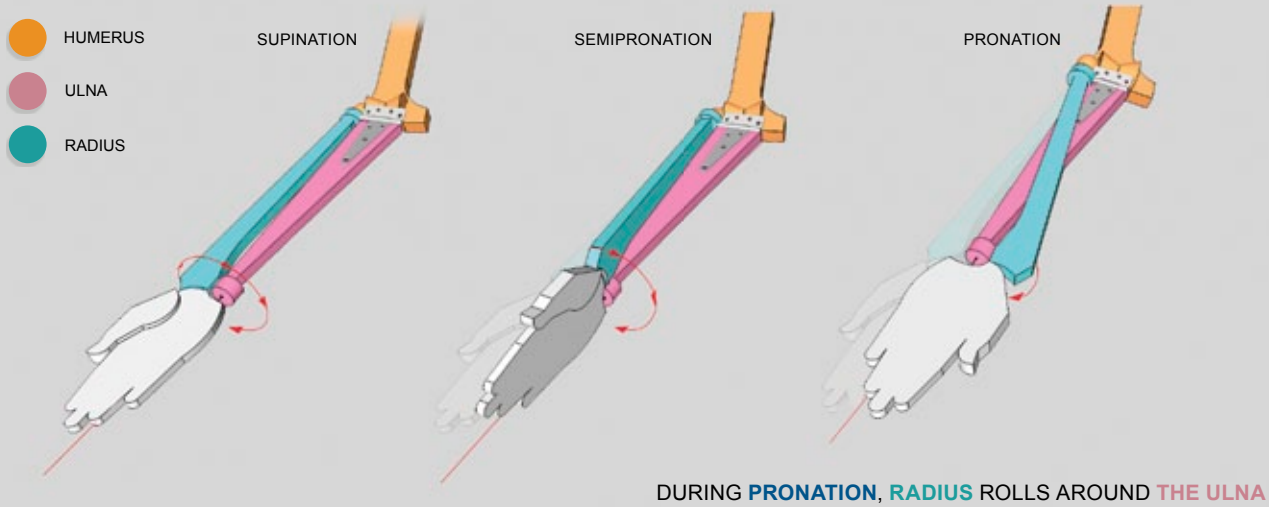
IN THE POSITION OF THE ARM CALLED **SUPINATION**, **THE RADIUS** AND **ULNA** ARE PARALLEL, THE PALM OF THE HAND FACES FORWARD OR UPWARD, AND THE THUMB IS AWAY FROM THE BODY. IN THE POSITION CALLED **PRONATION**, **THE RADIUS** AND **ULNA** ARE CROSSED, THE PALM FACES TO THE REAR OR DOWNWARD, AND THE THUMB IS TOWARD THE BODY.

SUPINATION – LIKE YOU'RE A WAITER CARRYING SOUP.



PRONATION – LIKE YOU'RE A PRO BASKETBALL PLAYER.

NOTE THAT PRONATION OF THE FOREARM DOES NOT INVOLVE ROTATION OF THE UPPER-ARM FROM THE SHOULDER JOINT!



DURING **PRONATION**, **RADIUS** ROLLS AROUND **THE ULNA**

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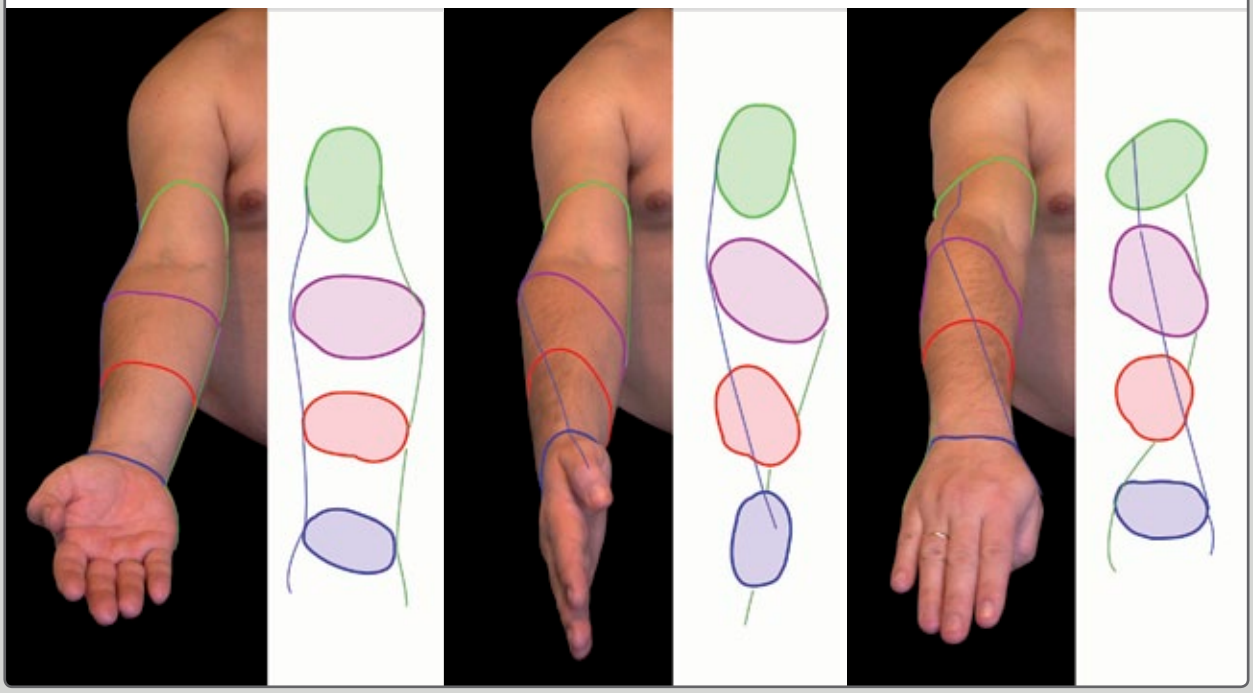
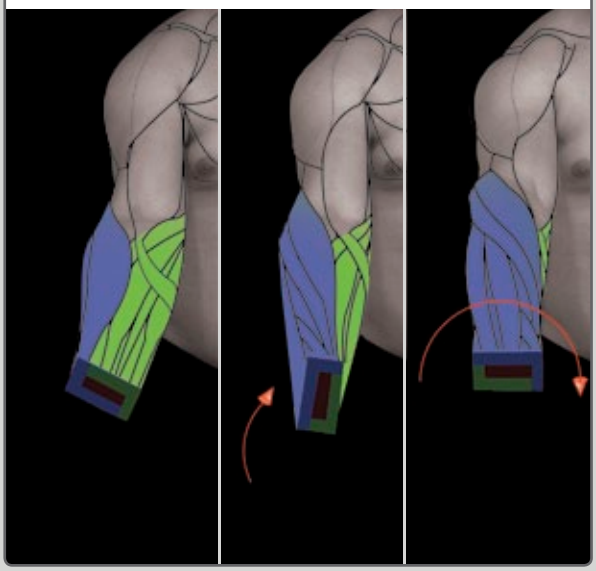
PRONATION AND FORM CHANGES

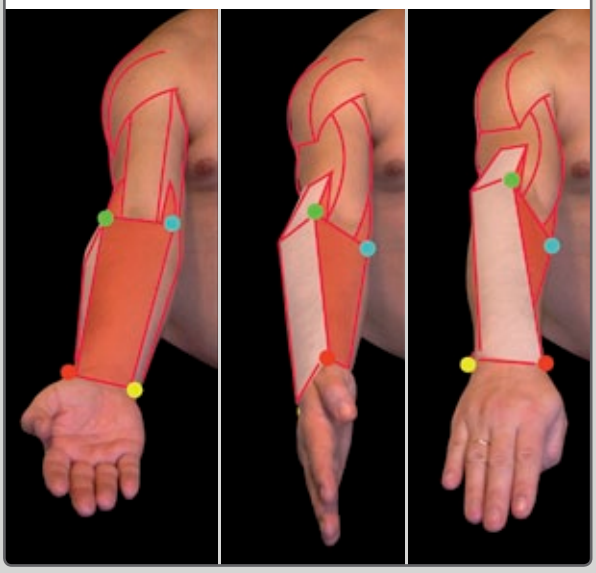
CROSS SECTIONS OF ARM DURING PRONATION



FLEXORS AND **EXTENSORS**



THIS IS AN EXAMPLE OF HOW IMPORTANT IT IS TO KNOW THE ORIGIN AND INSERTION POINTS OF MUSCLES.



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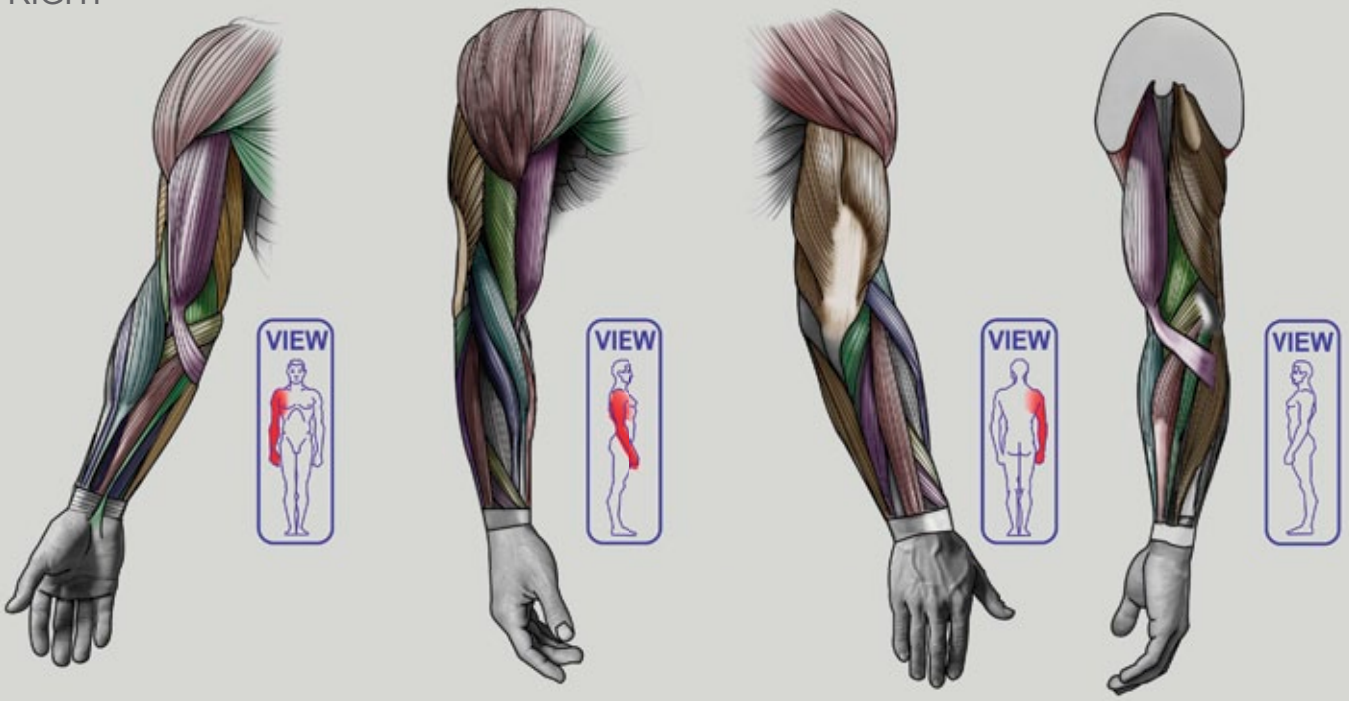
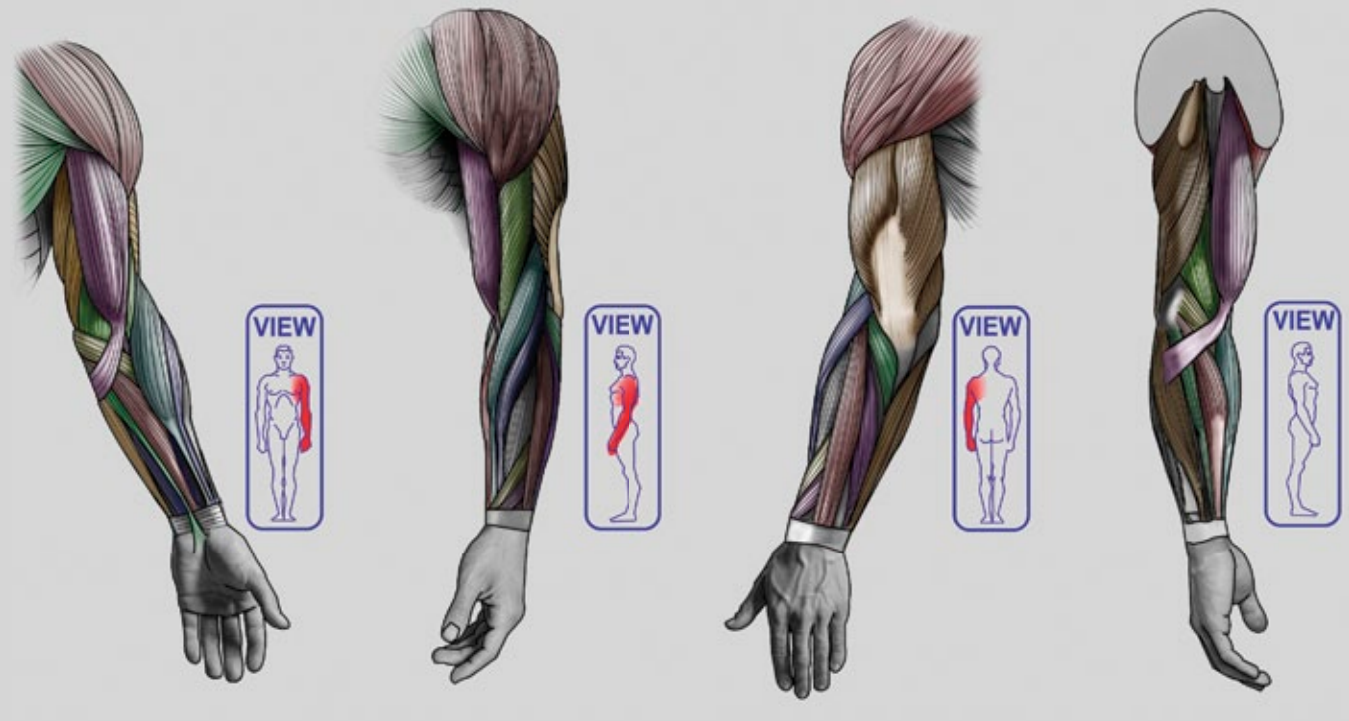
SUPINATED UPPER LIMB

(WHEN THE FOREARM OR PALM FACES TOWARD THE FRONT)

RIGHT



LEFT



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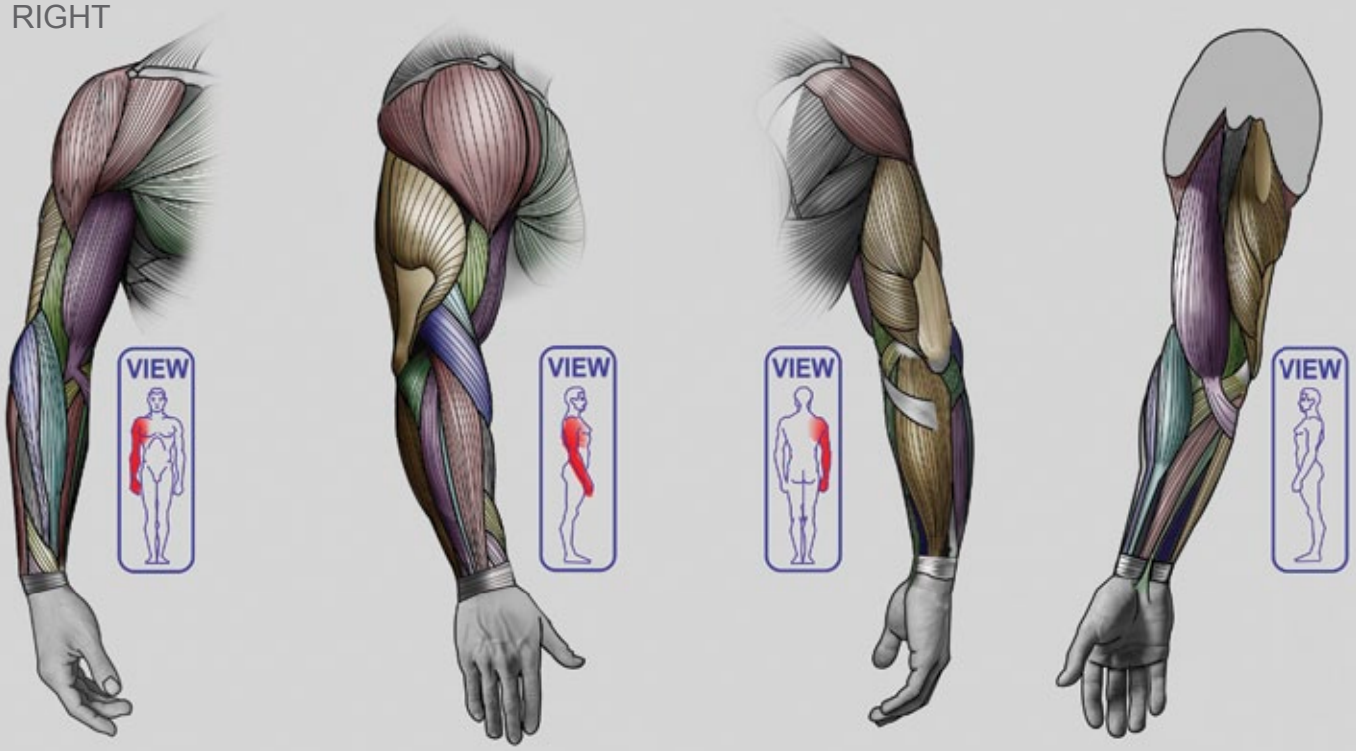
SEMIPRONATED UPPER LIMB

(WHEN THE FOREARM OR PALM FACES TOWARD THE TRUNK)

RIGHT



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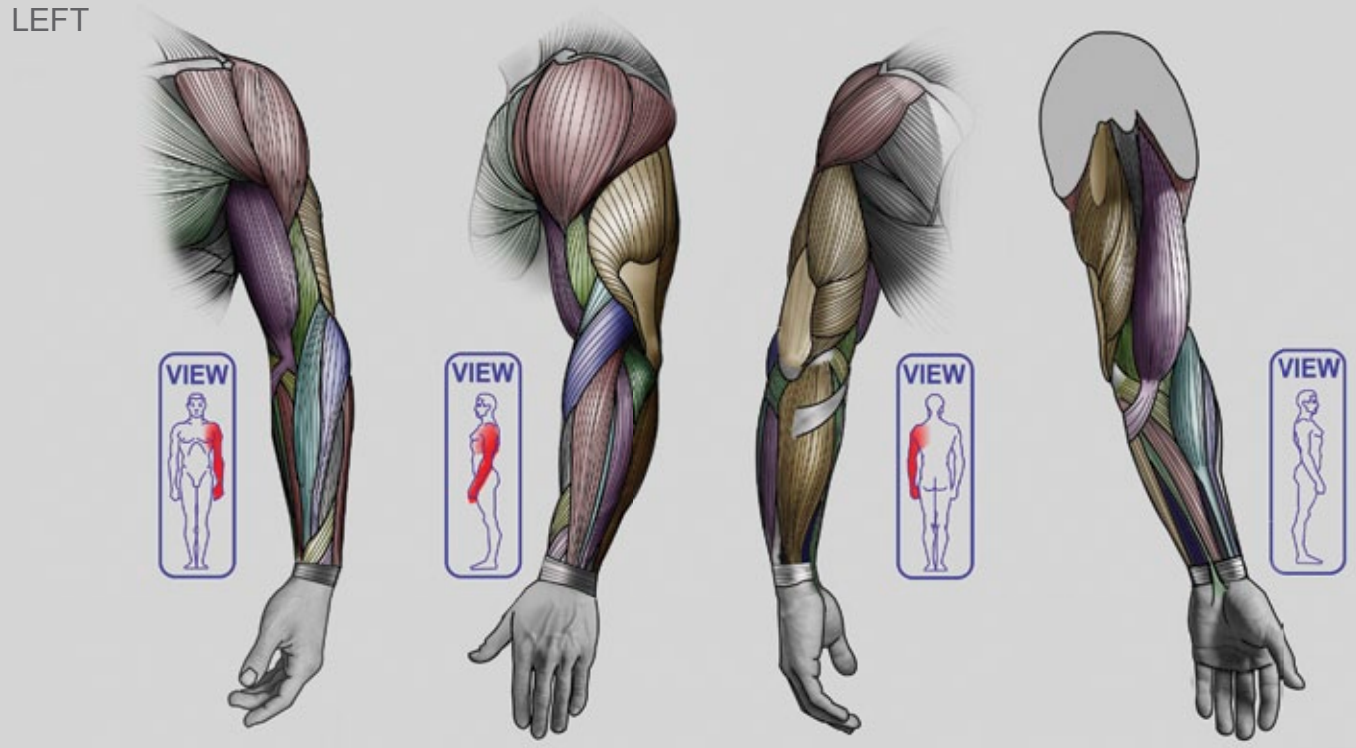

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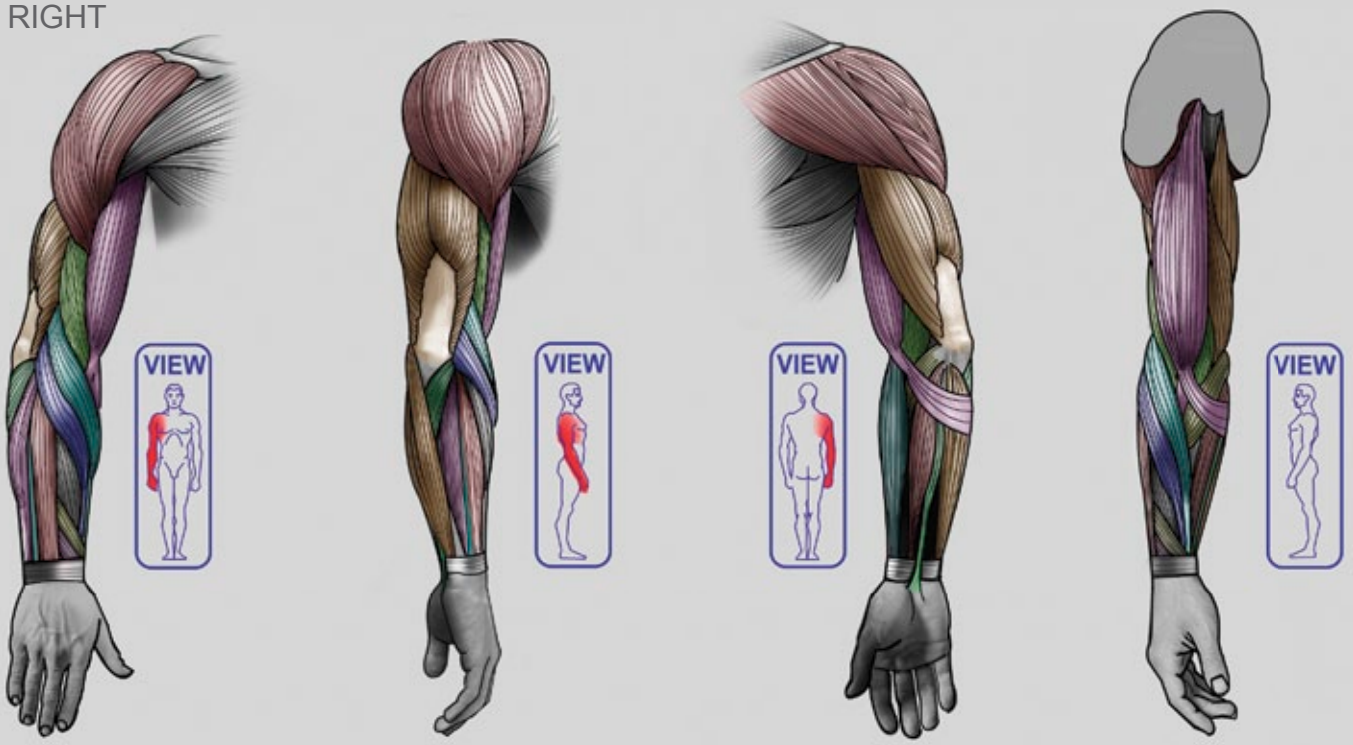
PRONATED UPPER LIMB

(WHEN FOREARM OR PALM FACES TOWARD THE BACK)

RIGHT



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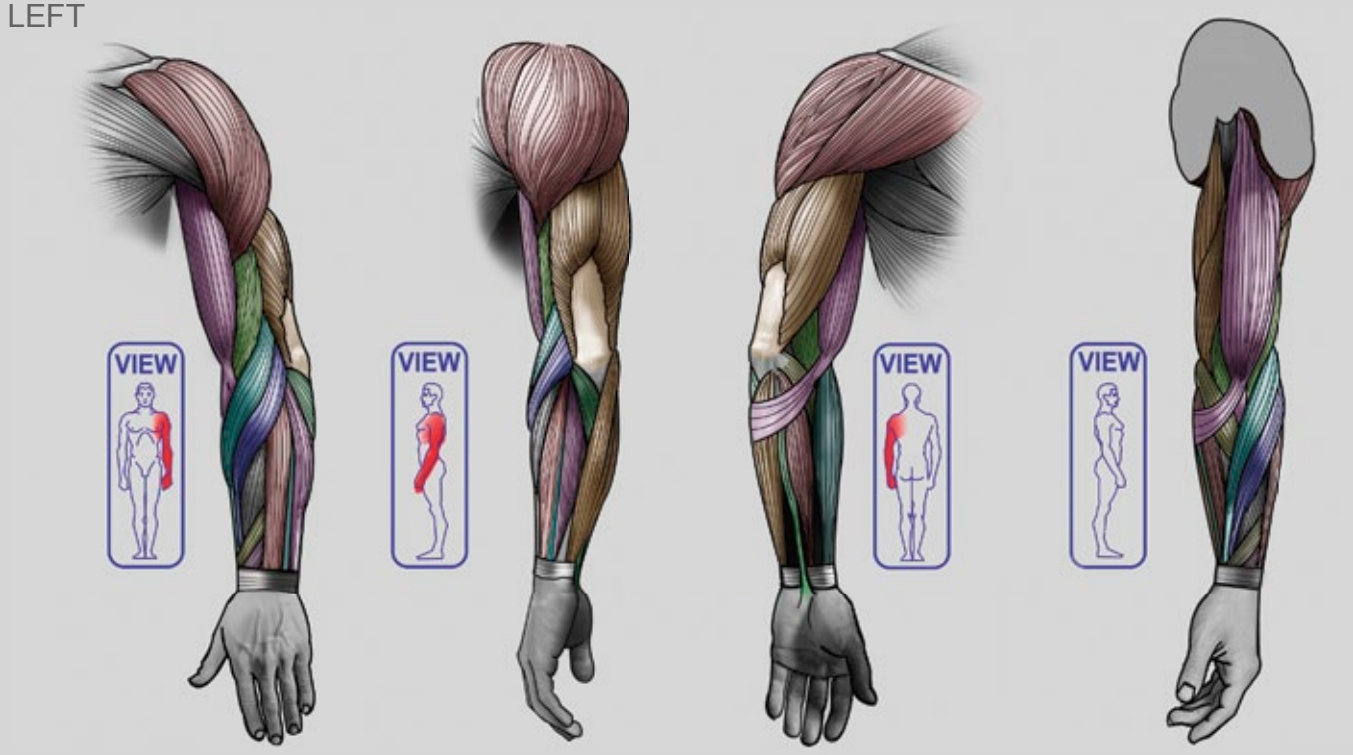

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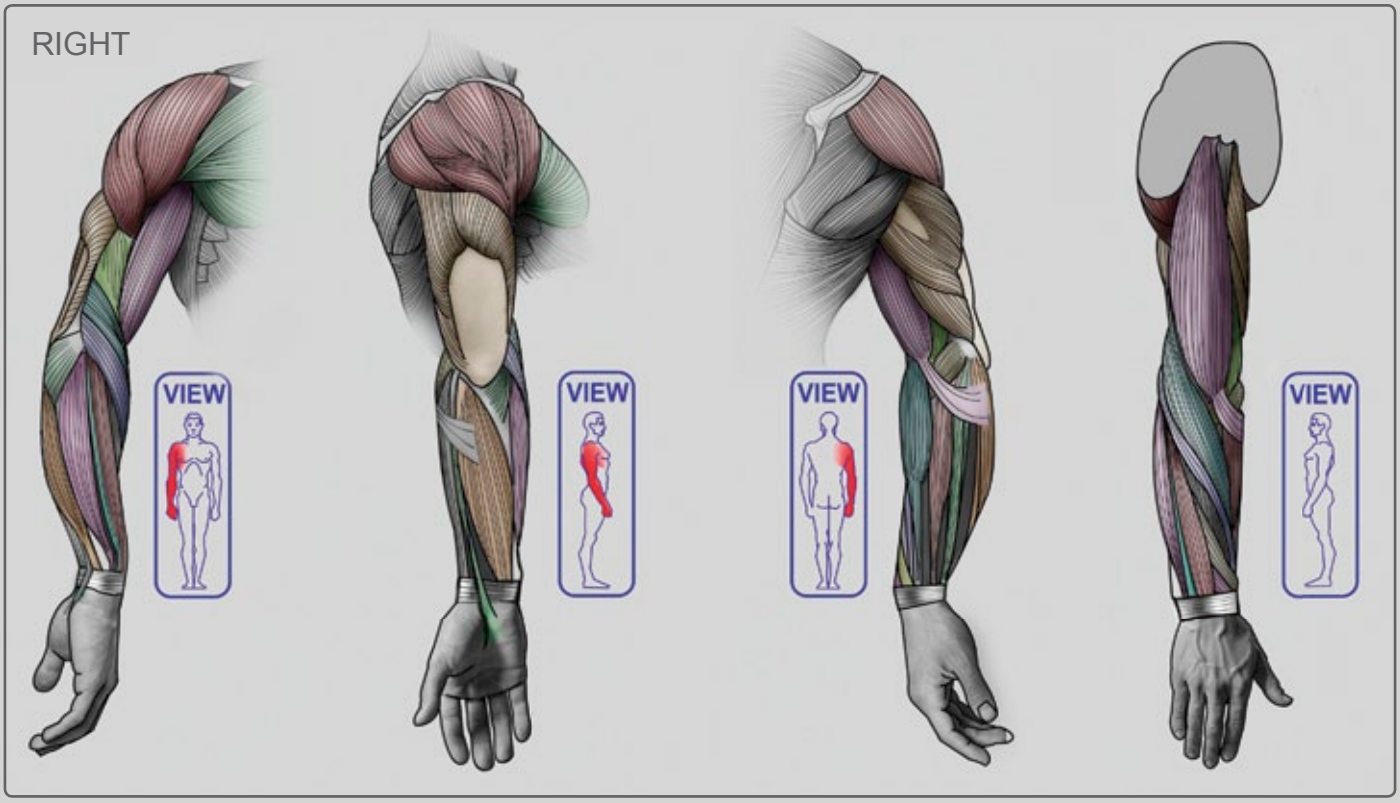
FORCED PRONATION OF THE UPPER LIMB

(WHEN THE FOREARM OR PALM FACES AWAY FROM THE TRUNK)

RIGHT



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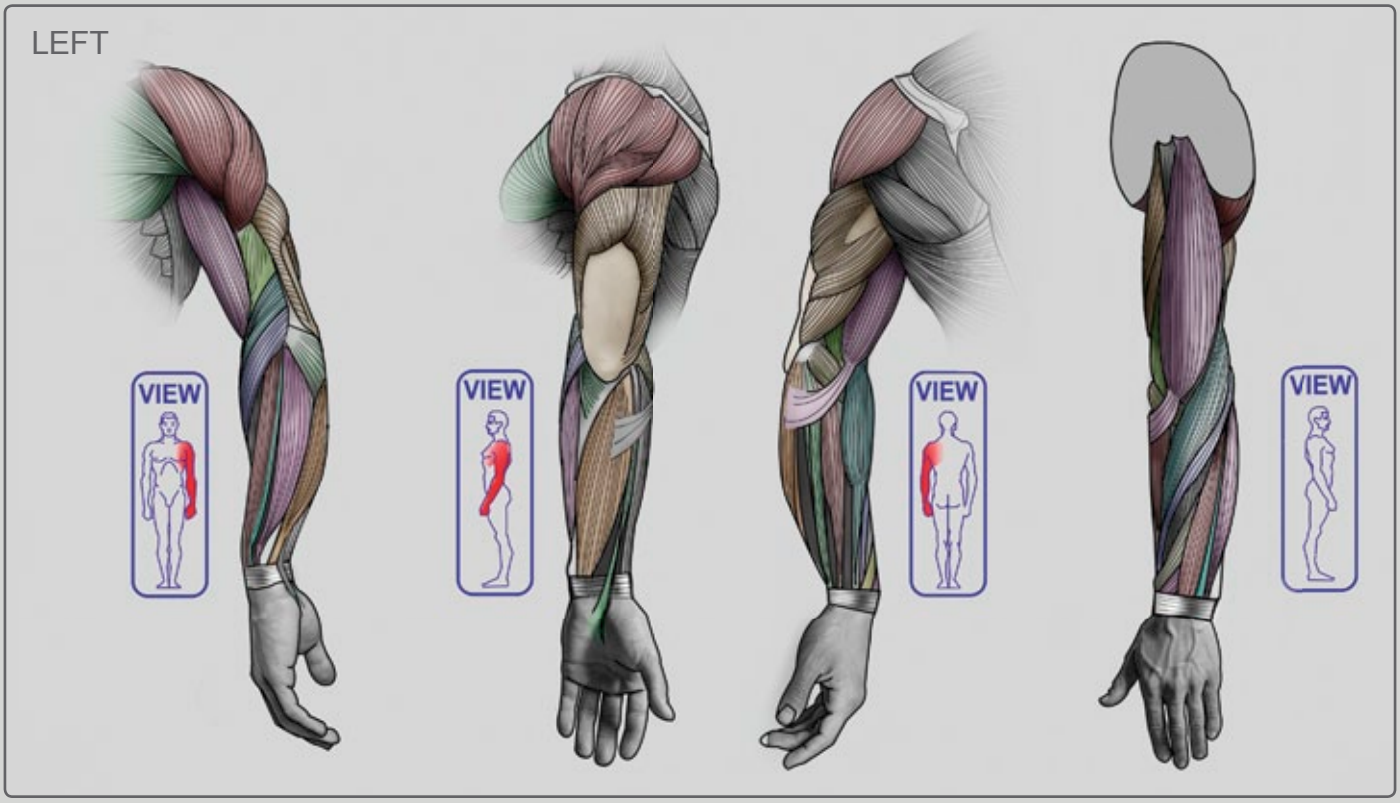

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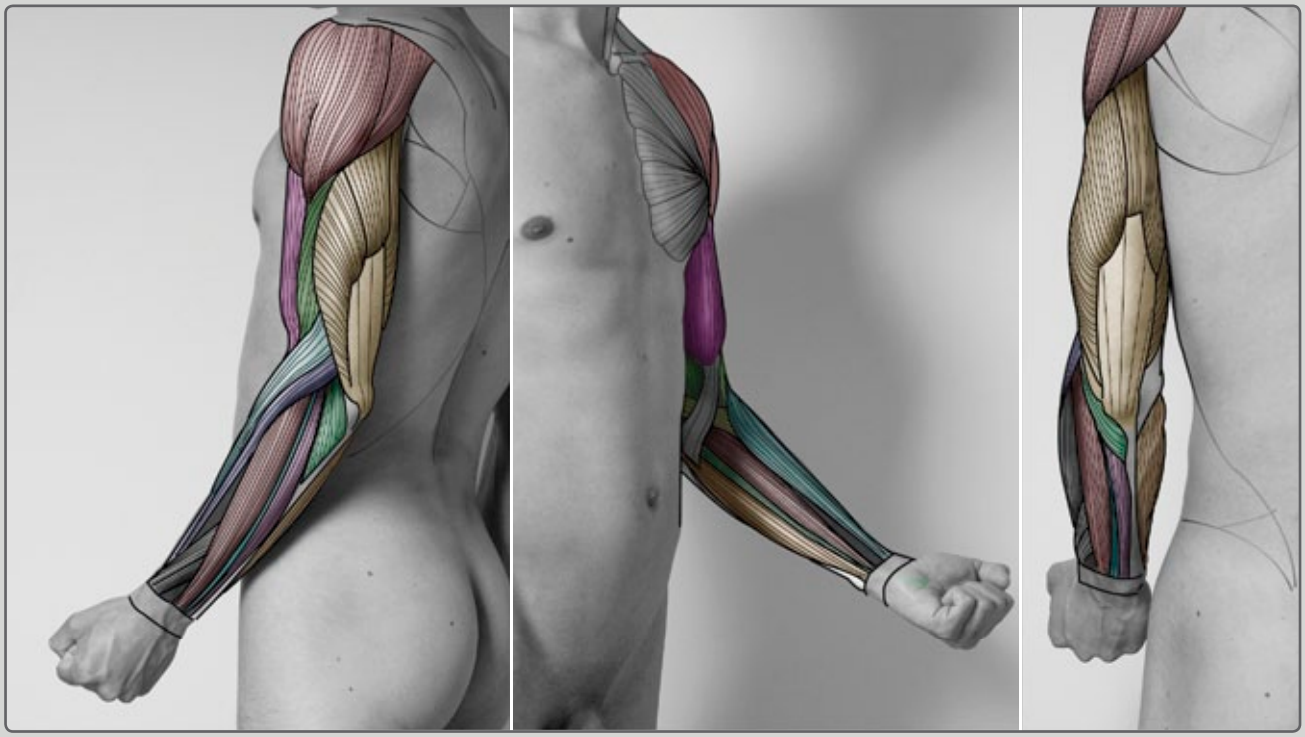
PARTIALLY FLEXED ARM

(AS IF HOLDING AN OBJECT)



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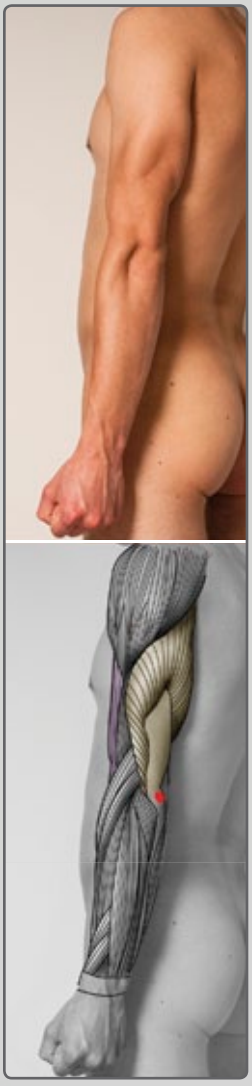
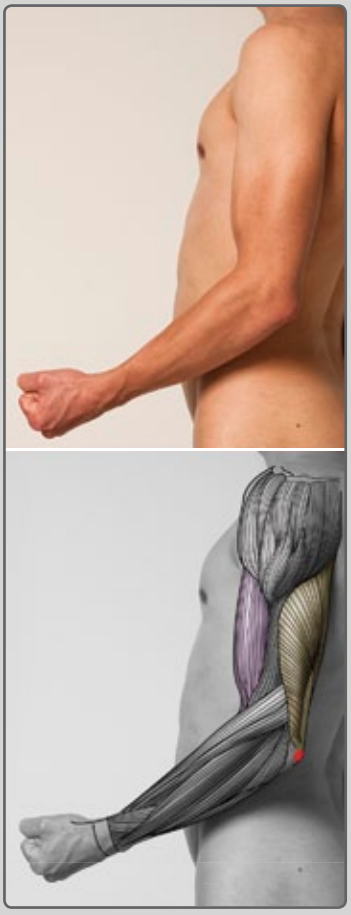
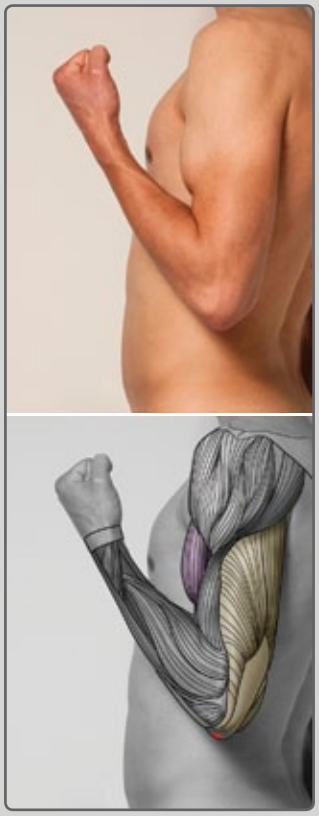
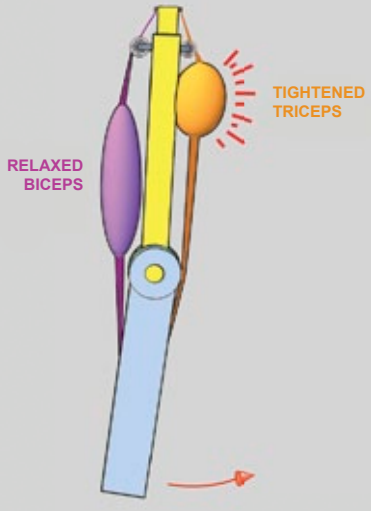
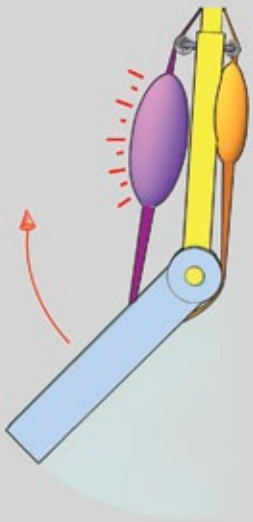
BICEPS AND TRICEPS IN ACTION

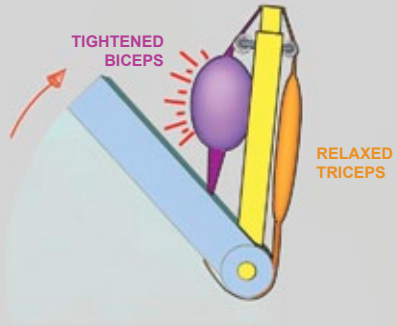


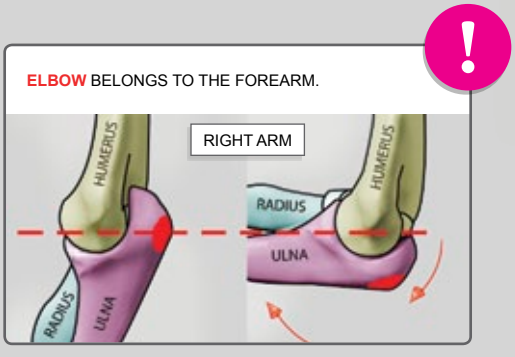












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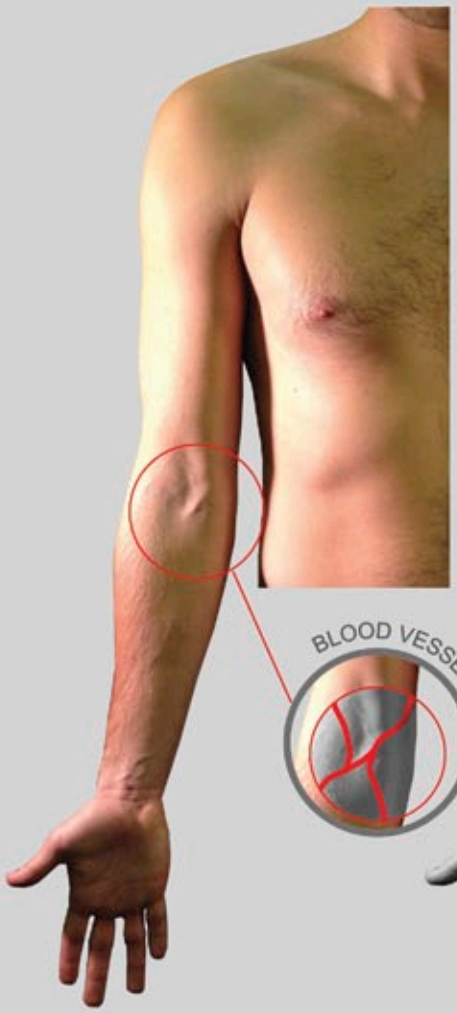
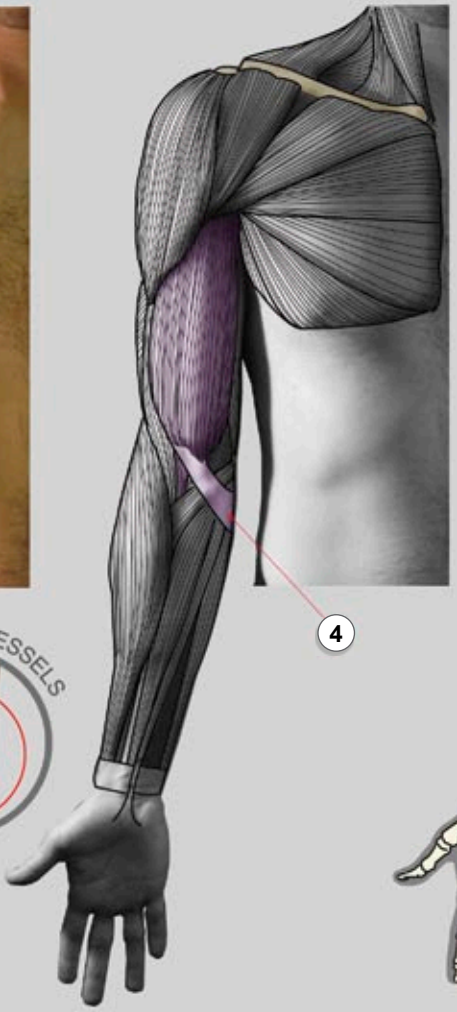
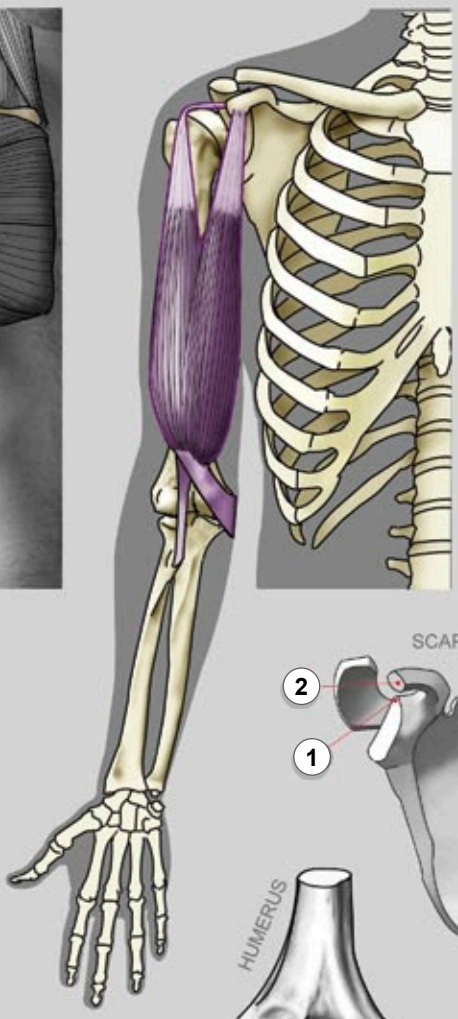
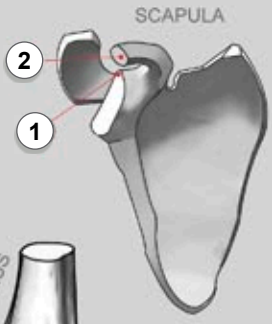
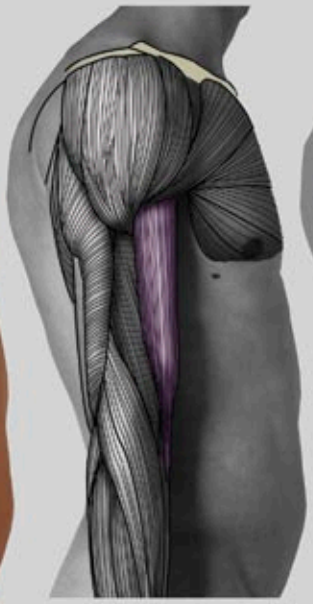
BICEPS BRACHII MUSCLE

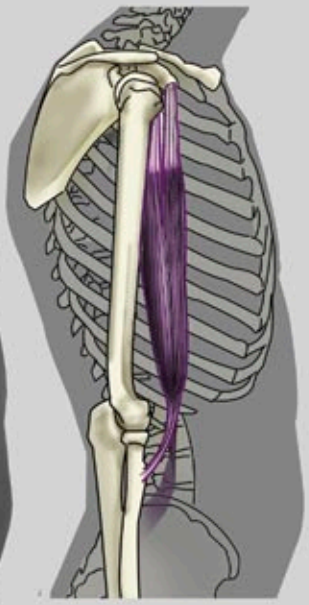












ACTION:

MOVES THE ARM FORWARD
AND ASSISTS IN TURNING
THE HAND OUTWARDS (SUPINATION)

ORIGIN: SCAPULA

1. SUPRAGLENOID TUBEROSITY
2. CORACOID PROCESS

INSERTION:

3. RADIAL TUBEROSITY
4. AND BICIPITAL APONEUROSIS INTO DEEP FASCIA ON MEDIAL PART OF FOREARM

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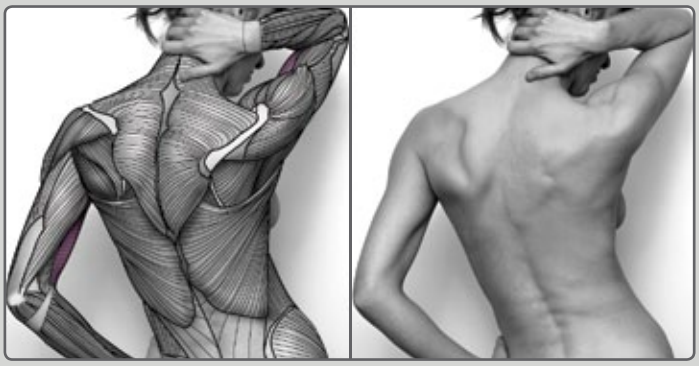
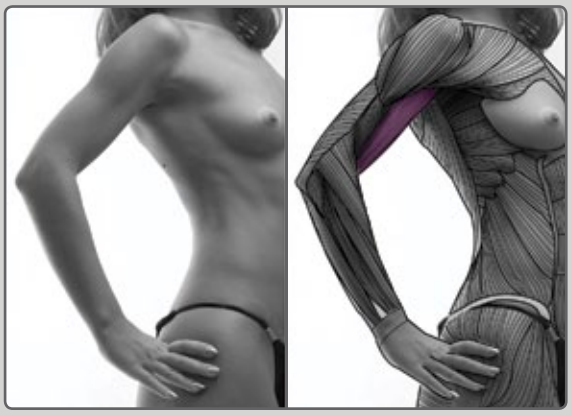
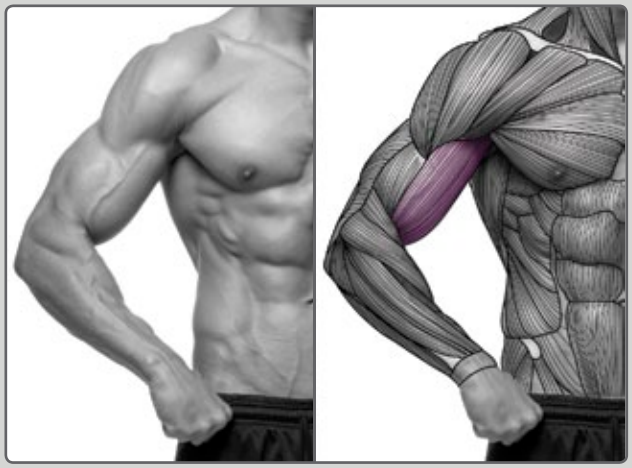
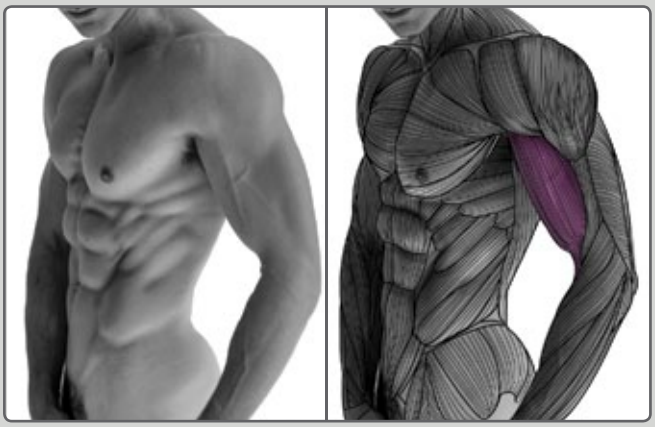
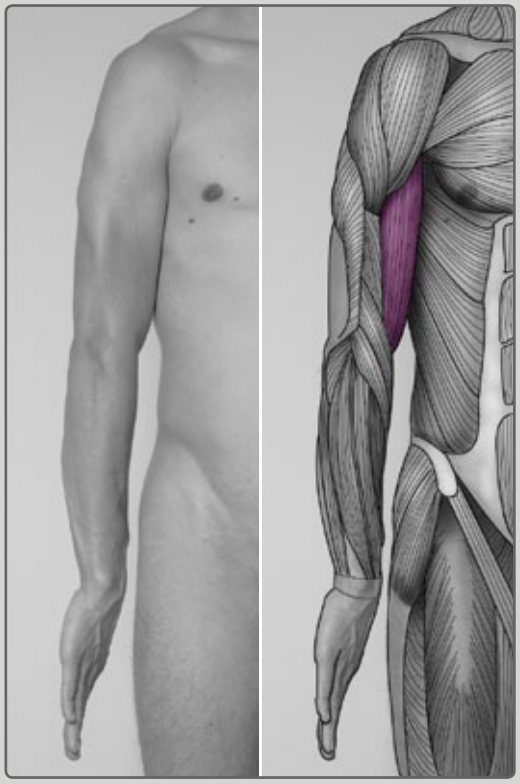
BICEPS BRACHII MUSCLE

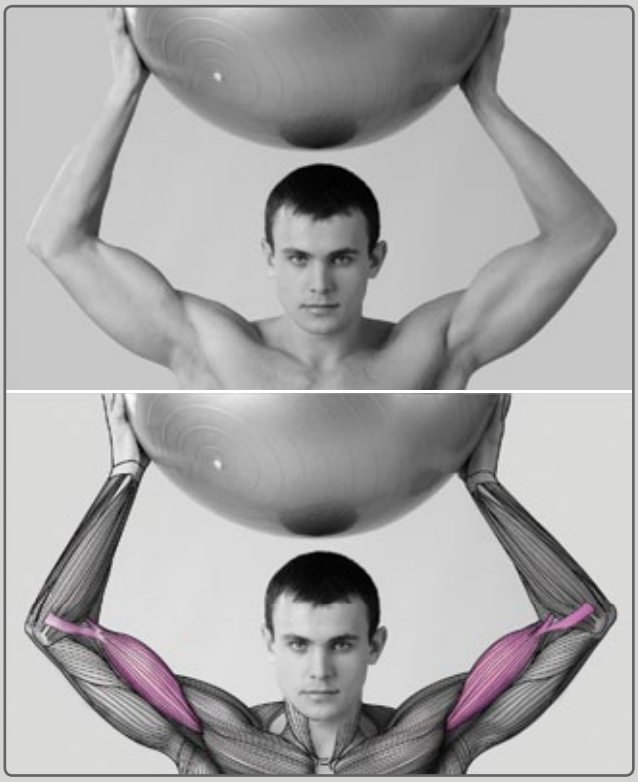












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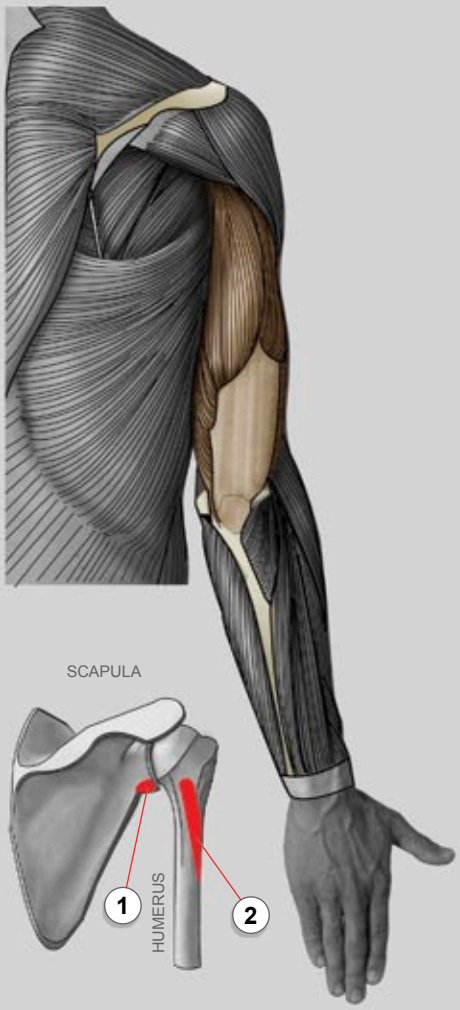
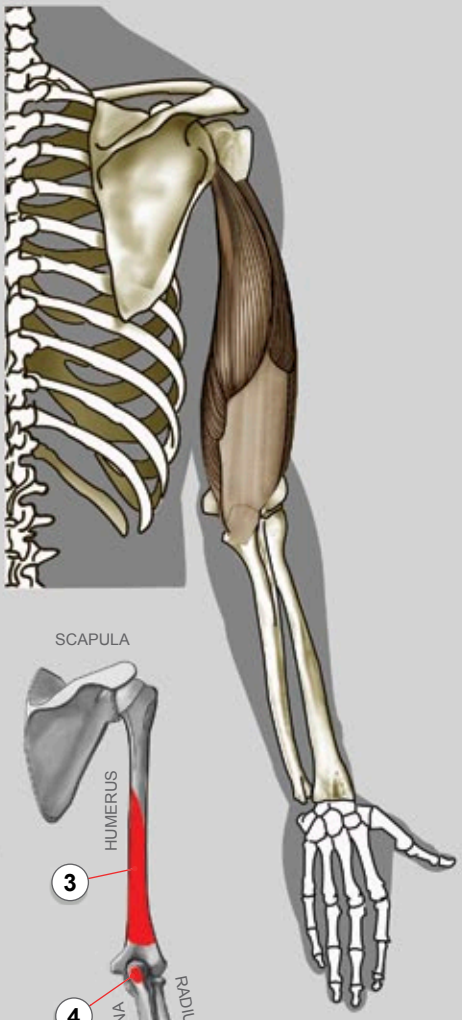
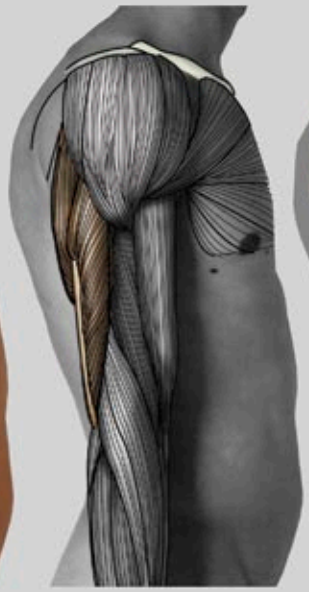
TRICEPS BRACHII MUSCLE







ACTION:

EXTENDS FOREARM
LONG HEAD EXTENDS SHOULDER

ORIGIN:

1. **LONG HEAD**: INFRAGLENOID TUBERCLE OF SCAPULA
2. **LATERAL HEAD**: ABOVE THE RADIAL SULCUS
3. **MEDIAL HEAD**: BELOW THE RADIAL SULCUS

INSERTION:

4. OLECRANON PROCESS OF ULNA

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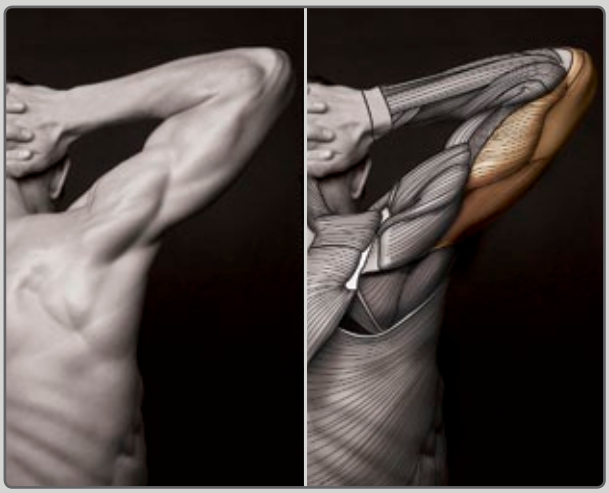
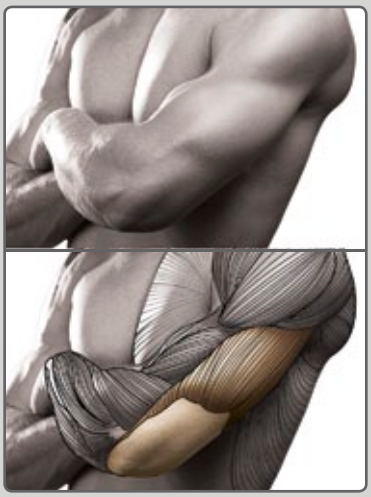
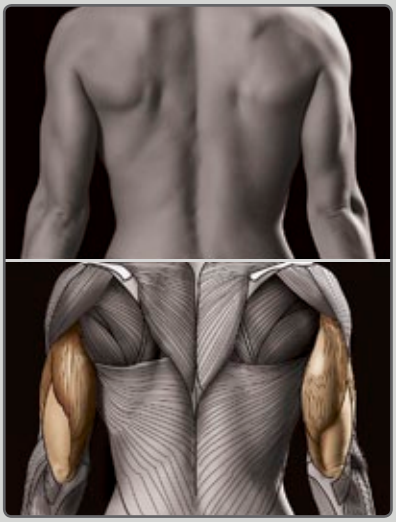
TRICEPS BRACHII MUSCLE







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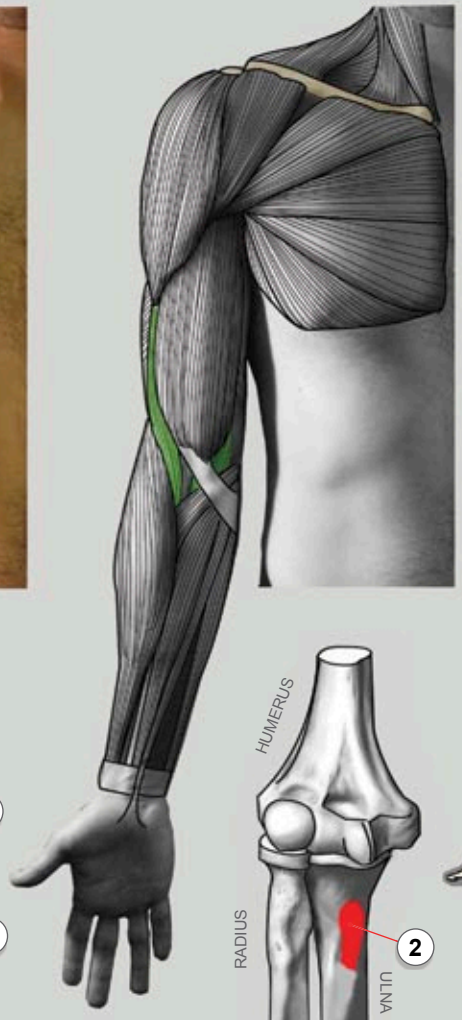
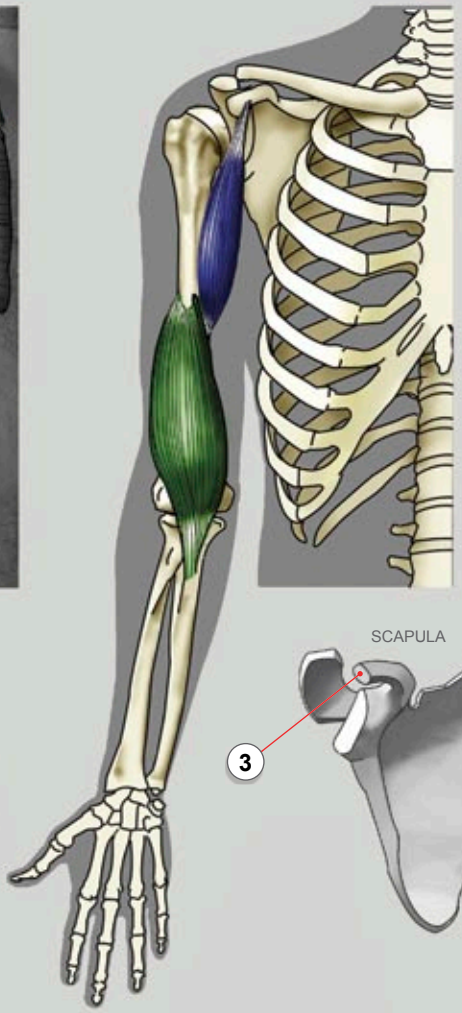
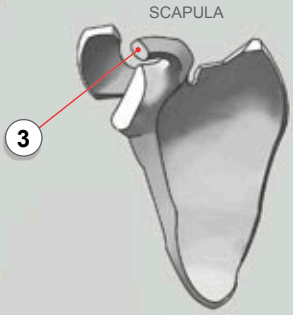
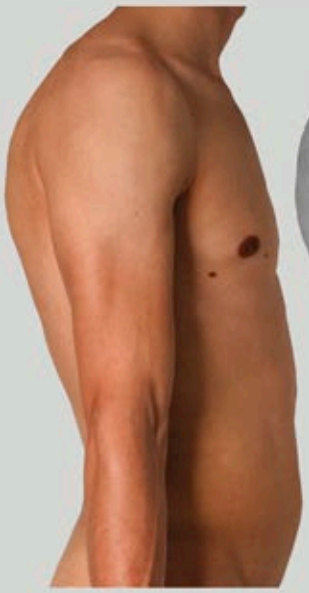
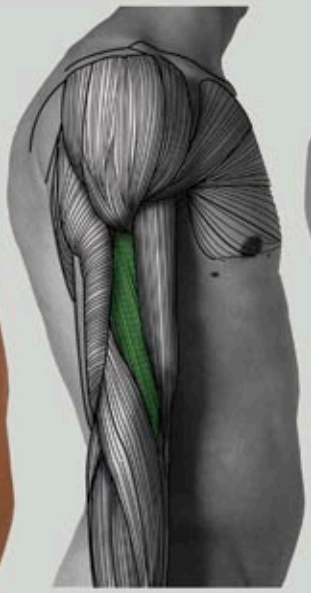
BRACHIALIS AND CORACOBRACHIALIS MUSCLES











BRACHIALIS

ACTION:

FLEXION AT ELBOW JOINT

ORIGIN:

1 ANTERIOR SURFACE OF THE HUMERUS

INSERTION:

2 CORONOID PROCESS AND THE TUBEROSITY OF THE ULNA

CORACOBRACHIALIS

ACTION:

ADDUCTS HUMERUS, FLEXES THE ARM AT GLENOHUMERAL JOINT

ORIGIN:

3 CORACOID PROCESS OF SCAPULA

INSERTION:

4 MEDIAL HUMERUS

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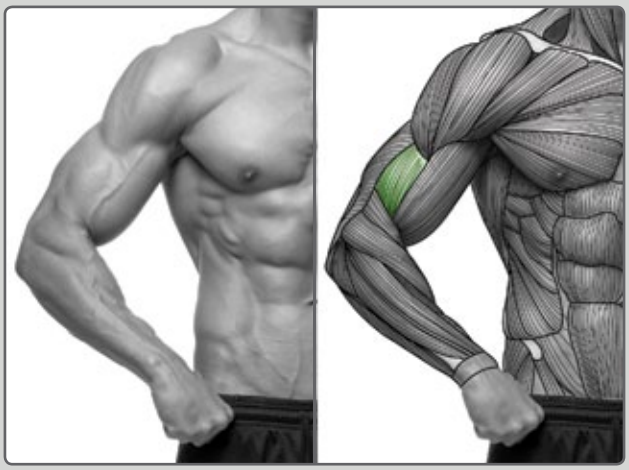
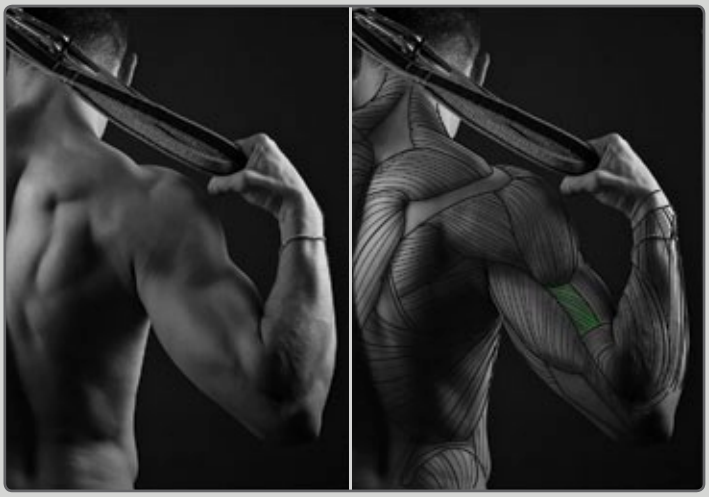
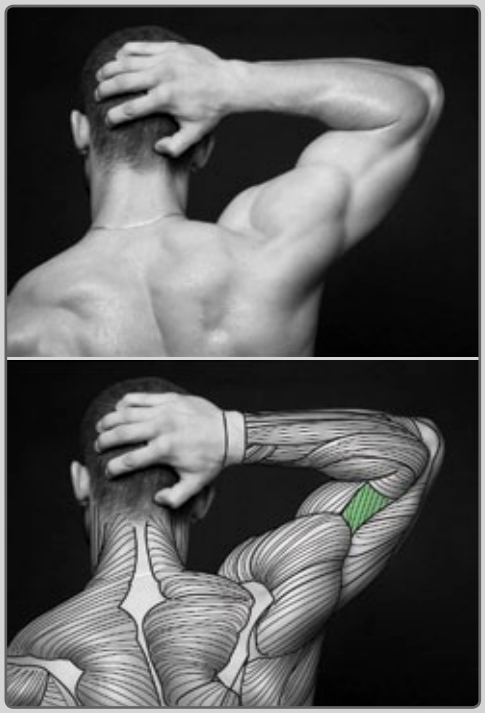
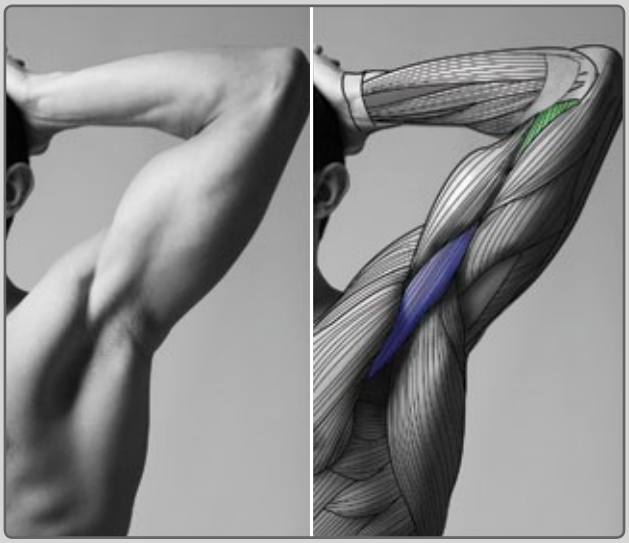
BRACHIALIS AND CORACOBRACHIALIS MUSCLES









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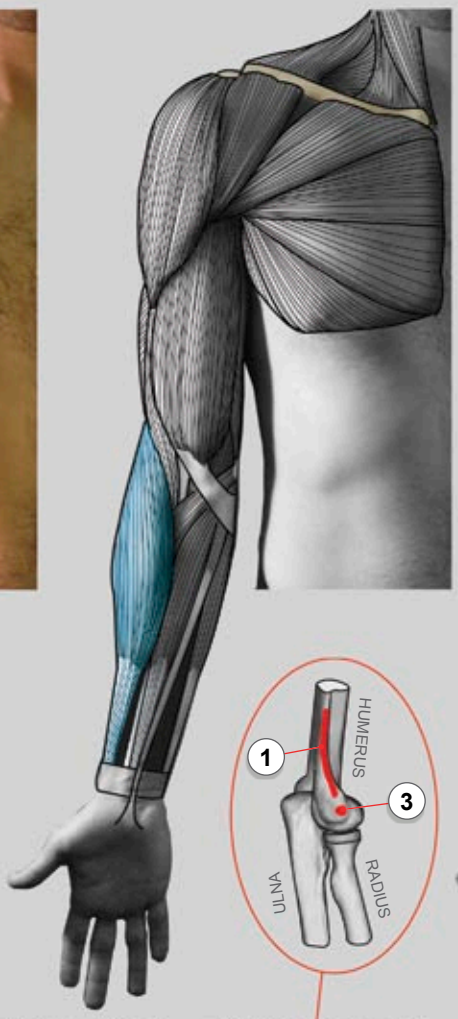
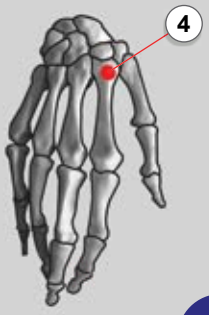
BRACHIORADIALIS AND EXTENSOR CARPI RADIALIS LONGUS



BACK WIEW OF RIGHT HAND



BRACHIORADIALIS

ACTION:

FLEXION OF ELBOW

ORIGIN:

1 LATERAL SUPRACONDYLAR RIDGE OF THE HUMERUS

INSERTION:

2 DISTAL RADIUS (RADIAL STYLOID PROCESS)

EXTENSOR CARPI RADIALIS LONGUS

ACTION:

EXTENSOR AT THE WRIST JOINT, ABDUCTS THE HAND AT THE WRIST

ORIGIN:

3 LATERAL SUPRACONDYLAR RIDGE

INSERTION:

4 2nd METACARPAL

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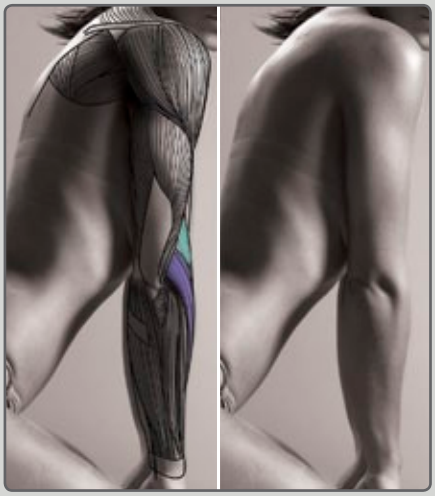
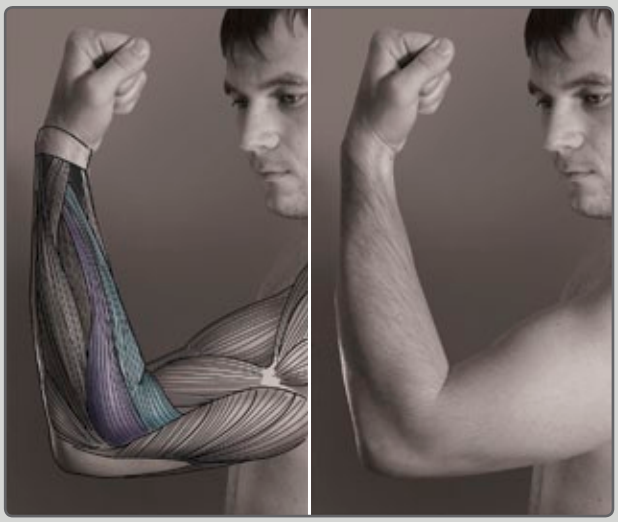
BRACHIORADIALIS AND EXTENSOR CARPI RADIALIS LONGUS

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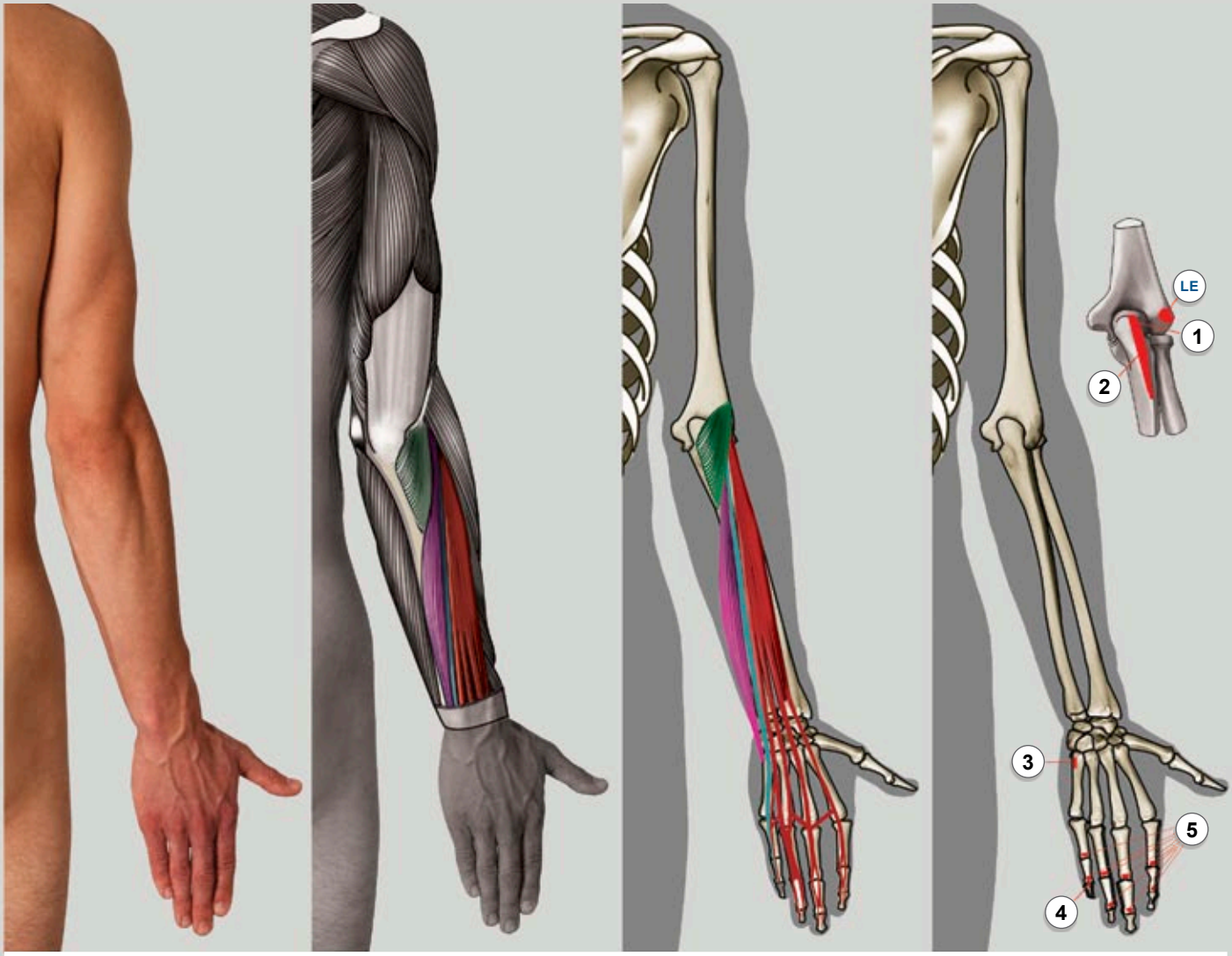
ANCONEUS, EXTENSOR CARPI ULNARIS, EXTENSOR DIGITI MINIMI AND EXTENSOR DIGITORUM MUSCLES



ANCONEUS

ACTION:

STABILIZES THE ELBOW

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS

INSERTION:

1 LATERAL SURFACE OF THE OLECRANON PROCESS

2 SUPERIOR PART OF THE POSTERIOR ULNA DISTALLY

EXTENSOR CARPI ULNARIS

ACTION:

EXTENDS AND ADDUCTS THE WRIST

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS, ULNA

INSERTION:

3 5th METACARPAL

EXTENSOR DIGITI MINIMI

ACTION:

EXTENDS THE WRIST AND THE LITTLE FINGER AT ALL JOINTS

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS

INSERTION:

4 AT THE EXTENSOR EXPANSION ON PROXIMAL PHALANX OF THE LITTLE FINGER

EXTENSOR DIGITORUM

ACTION:

EXTENDS HAND, WRIST AND FINGERS

ORIGIN:

LE LATERAL EPICONDYLE OF THE HUMERUS

INSERTION:

5 EXTENSOR EXPANSION OF MIDDLE AND DISTAL PHALANGES OF THE 2nd, 3rd, 4th AND 5th FINGERS

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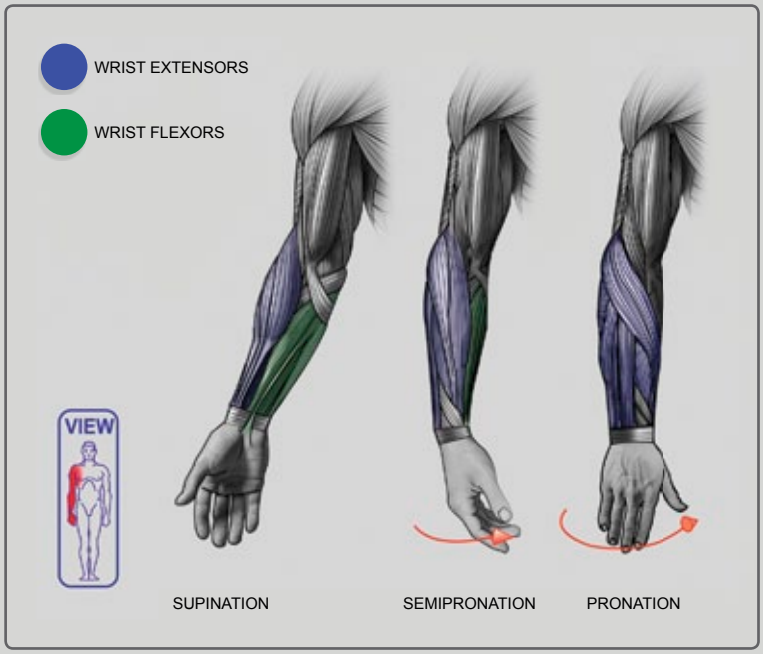
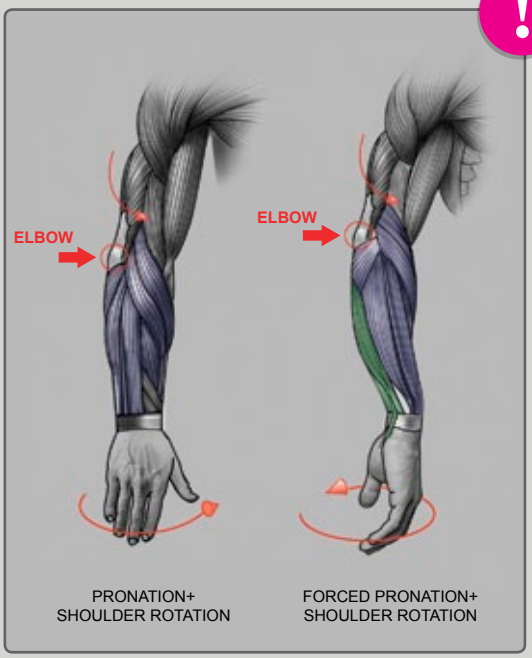
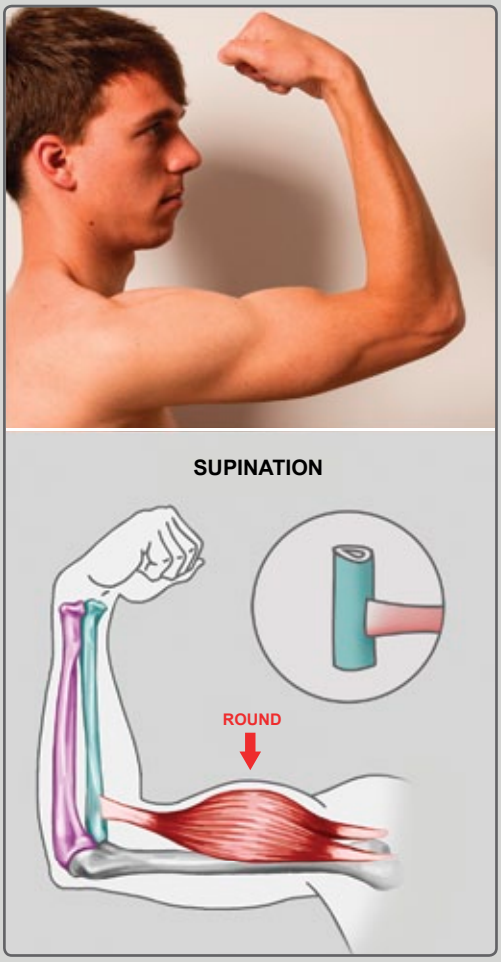
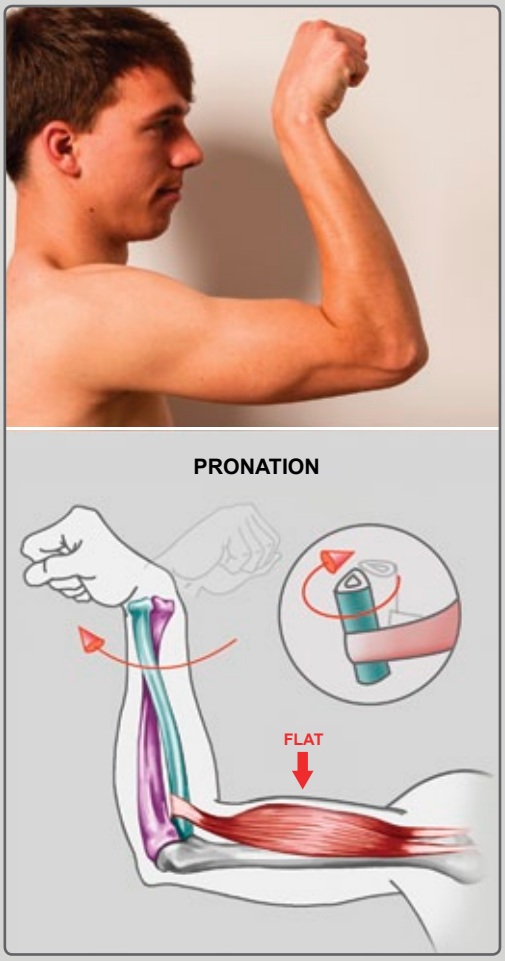
SUPINATION AND PRONATION









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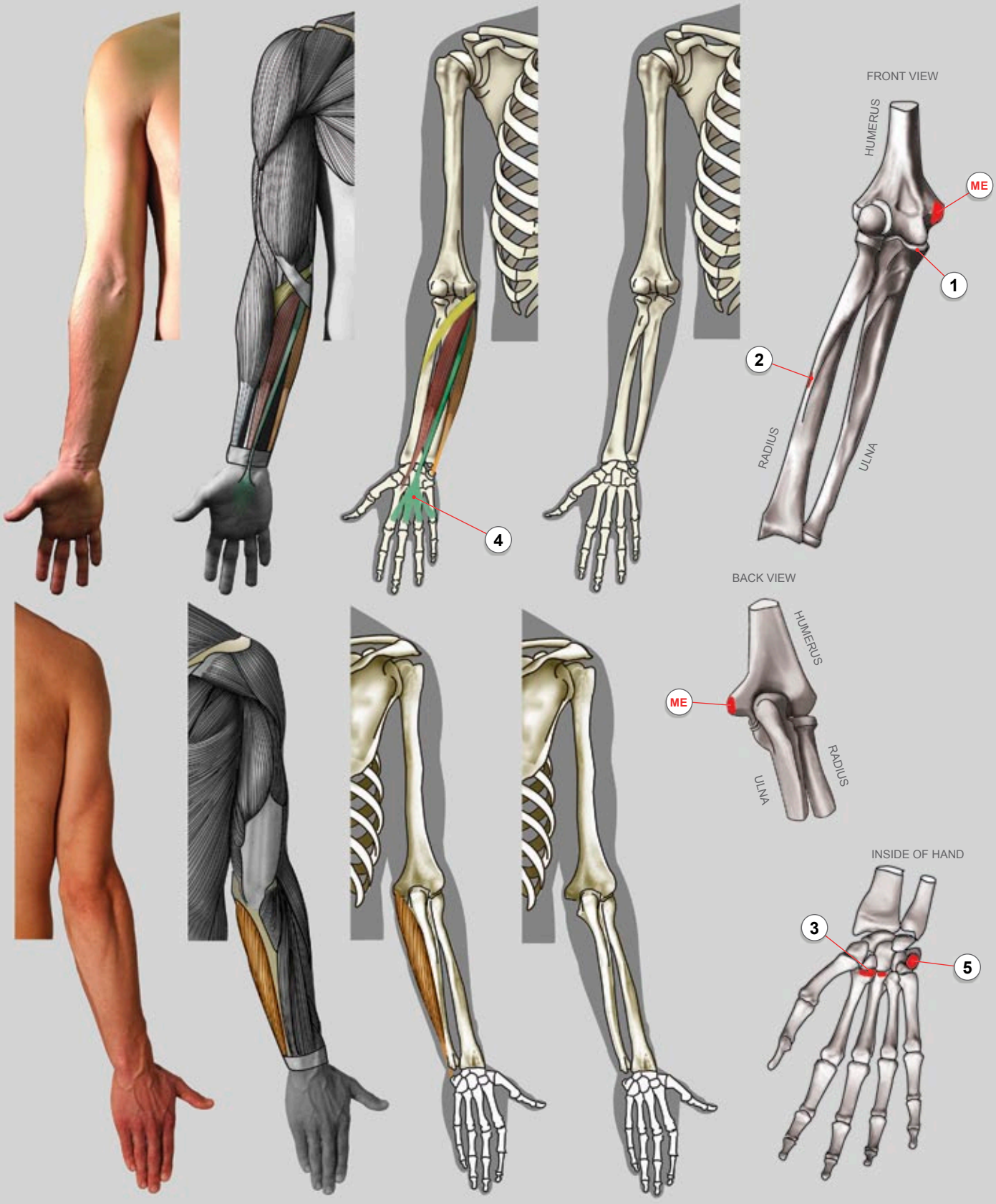
FLEXOR MUSCLES



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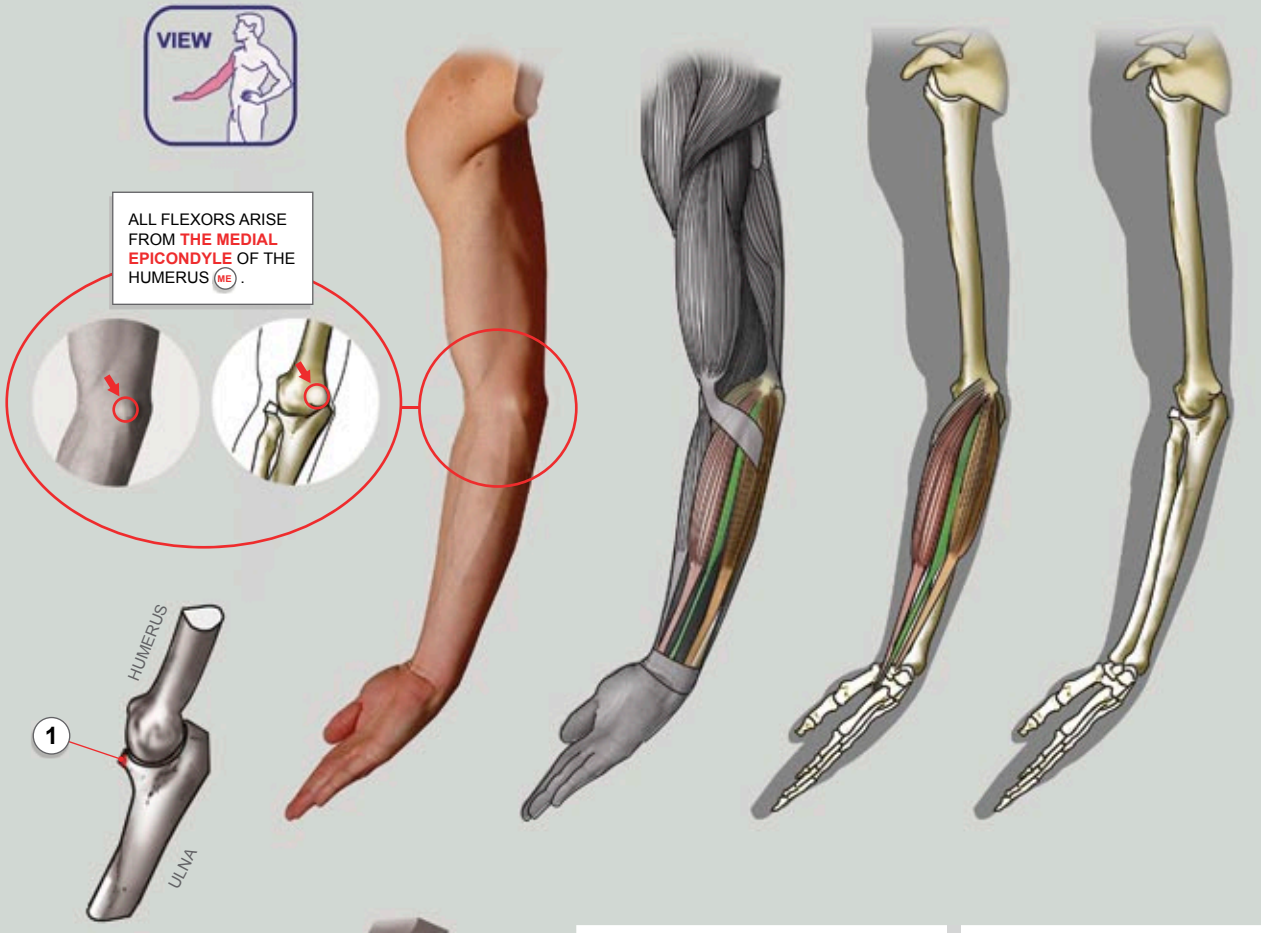
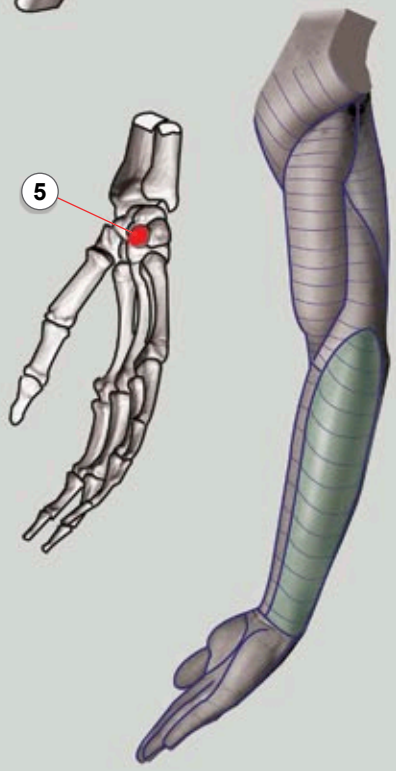
FLEXOR MUSCLES
(FROM INNER SIDE)





PRONATOR TERES

ACTION:

PRONATION OF FOREARM, FLEXES ELBOW

ORIGIN:

(ME) MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

(1) ULNAR HEAD: CORONOID PROCESS OF ULNA

INSERTION:

(2) MIDDLE OF THE LATERAL SURFACE OF THE RADIUS

PALMARIS LONGUS

ACTION:

WRIST FLEXOR

ORIGIN:

(ME) MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

INSERTION:

(4) PALMAR APONEUROSIS

FLEXOR CARPI RADIALIS

ACTION:

FLEXION AND ABDUCTION AT WRIST

ORIGIN:

(ME) MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

INSERTION:

(3) BASE OF SECOND AND THIRD METACARPAL BONES

FLEXOR CARPI ULNARIS

ACTION:

FLEXION AND ABDUCTION AT WRIST

ORIGIN:

(ME) MEDIAL EPICONDYLE OF HUMERUS (COMMON FLEXOR TENDON)

INSERTION:

(5) PISIFORM

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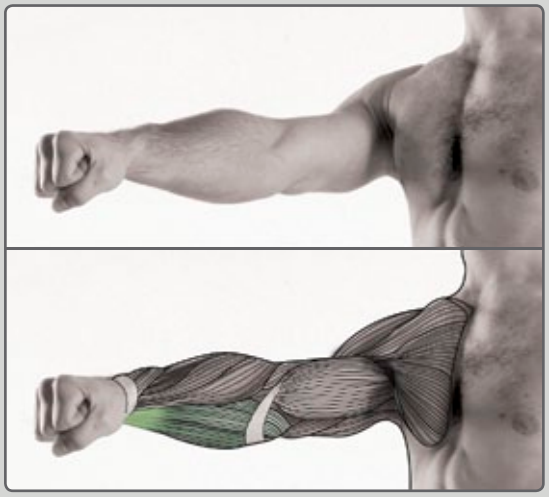
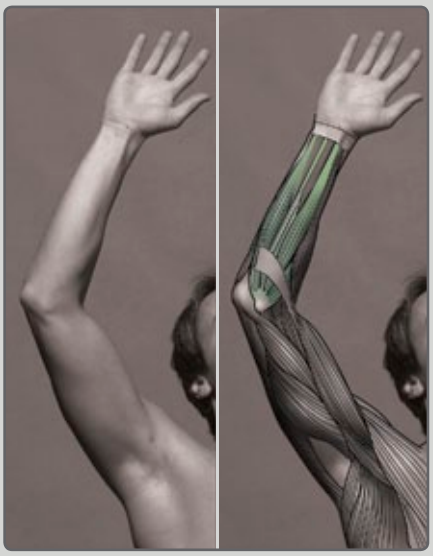
FLEXOR MUSCLES





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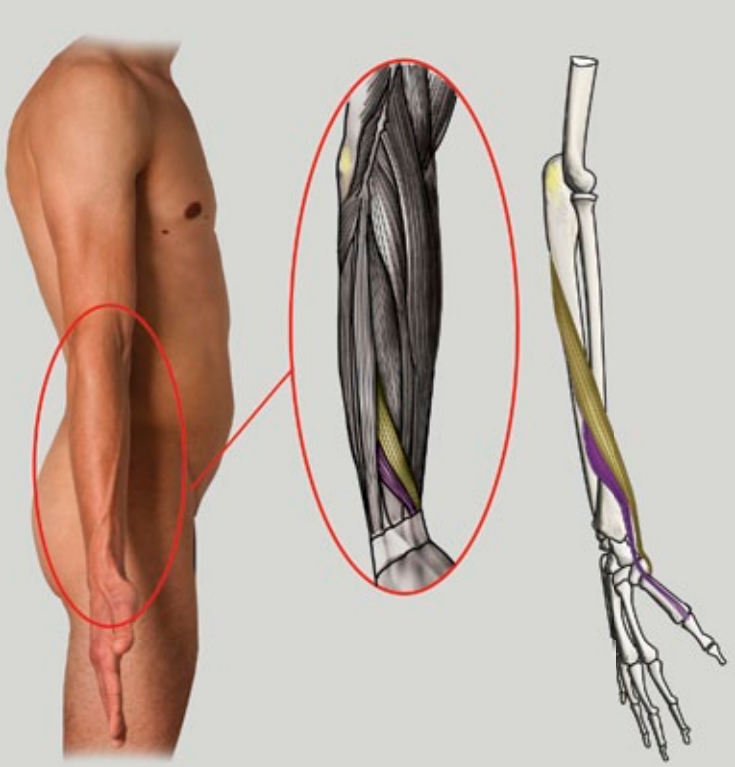
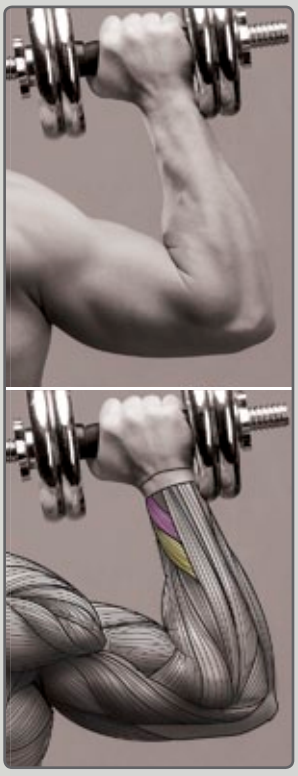
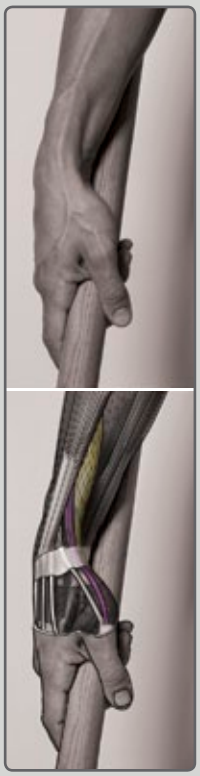
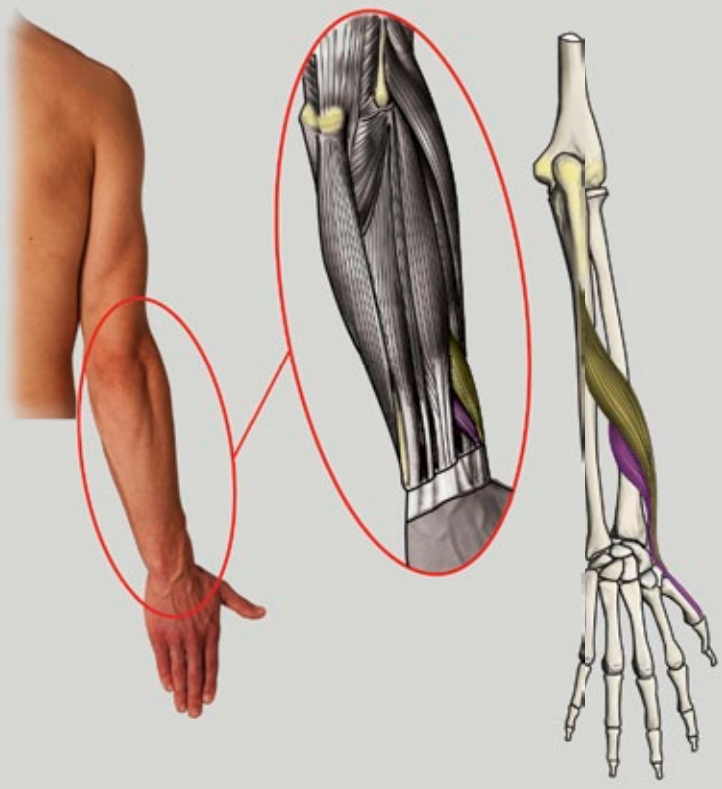
ABDUCTOR POLLICIS LONGUS AND EXTENSOR POLLICIS BREVIS MUSCLES









ABDUCTOR POLLICIS LONGUS

ACTION:

ABDUCTION, EXTENSION OF THUMB

ORIGIN:

ULNA, RADIUS,
INTEROSSEOUS MEMBRANE

INSERTION:

FIRST METACARPAL

EXTENSOR POLLICIS BREVIS

ACTION:

EXTENSION OF THUMB AT
METACARPOPHALANGEAL JOINT

ORIGIN:

RADIUS AND THE INTEROSSEOUS MEMBRANE

INSERTION:

THUMB, PROXIMAL PHALANX

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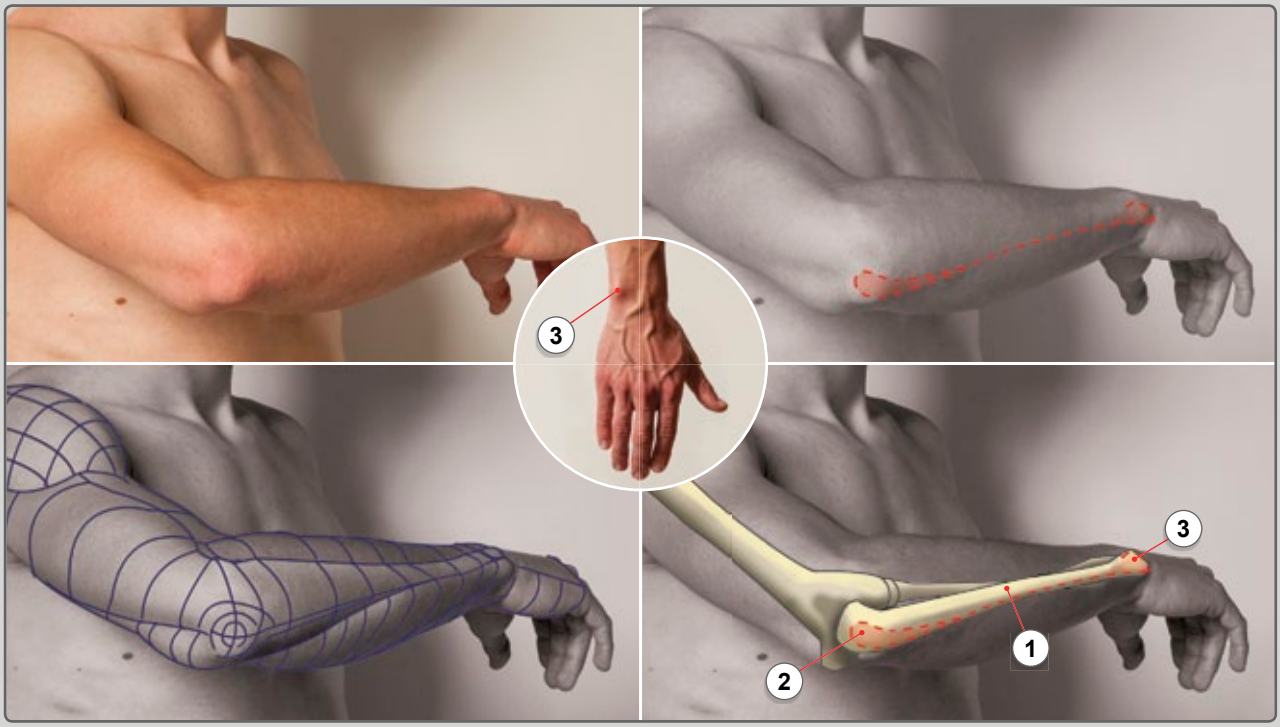
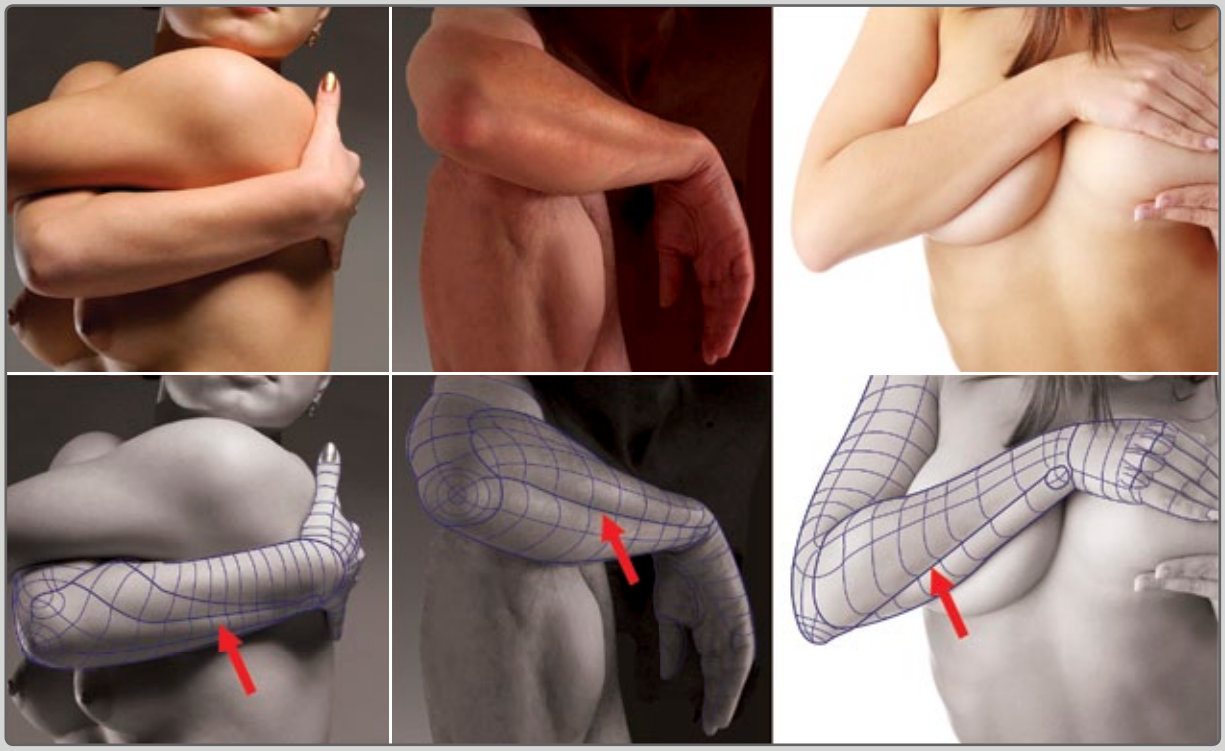
THE BODY OF THE ULNA



THE BODY OF **THE ULNA** (1) IS AN IMPORTANT LANDMARK. WHEREVER YOU TURN THE HAND, THE ULNA ALWAYS EXTENDS FROM **THE ELBOW** (2) TO LITTLE FINGER SIDE OF THE HAND, WHERE IT IS VISIBLE AS **A BUMP** (3) IT IS ALWAYS VISIBLE AS A RIDGE OR FURROW. BOTH ENDS OF THE BONE ARE NOT COVERED BY MUSCLES, ONLY BY THIN LAYER OF SKIN.



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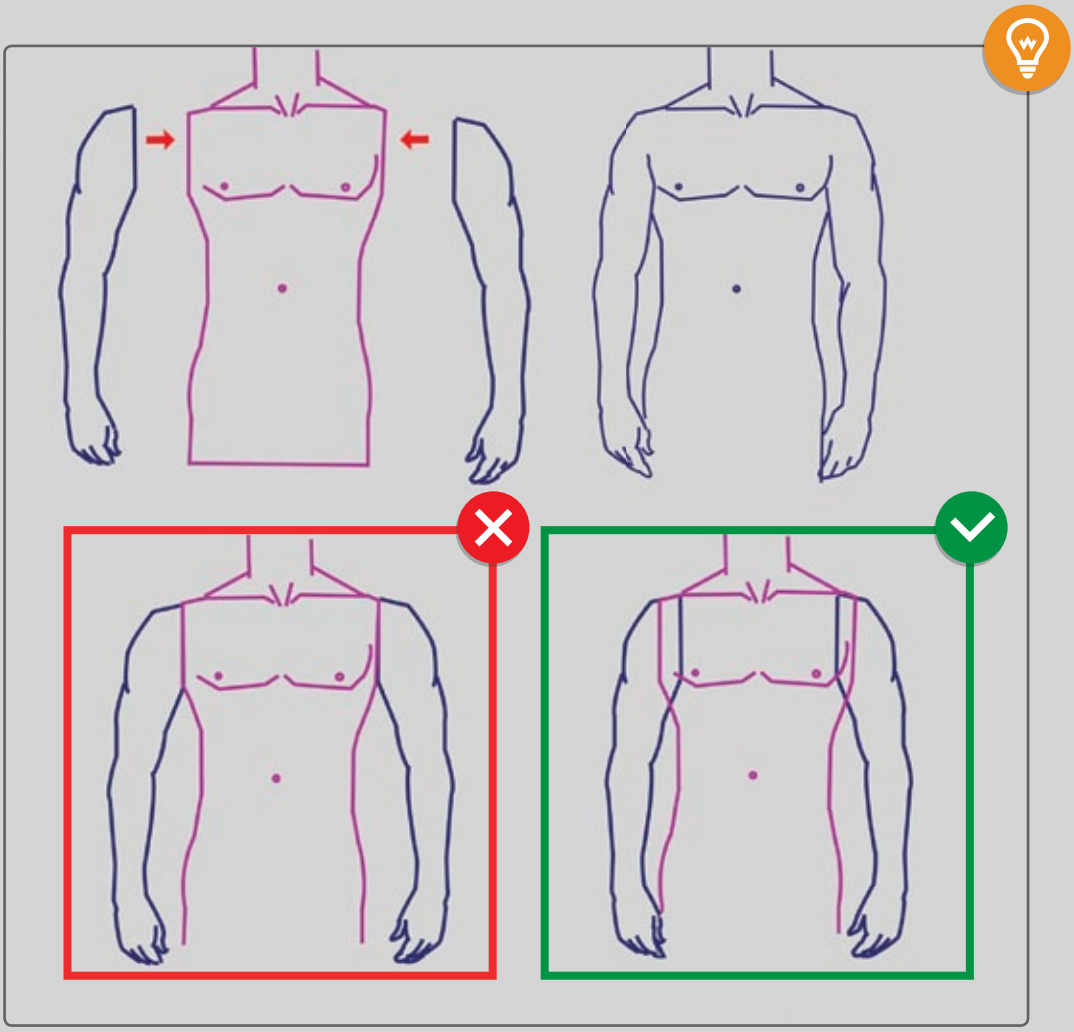
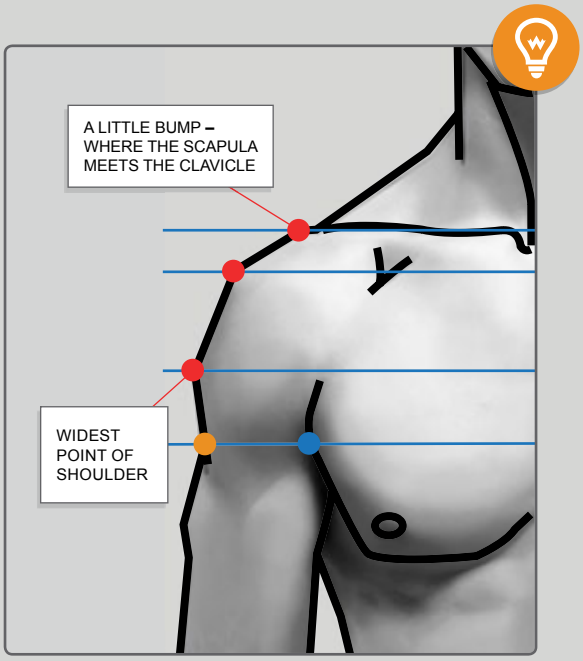
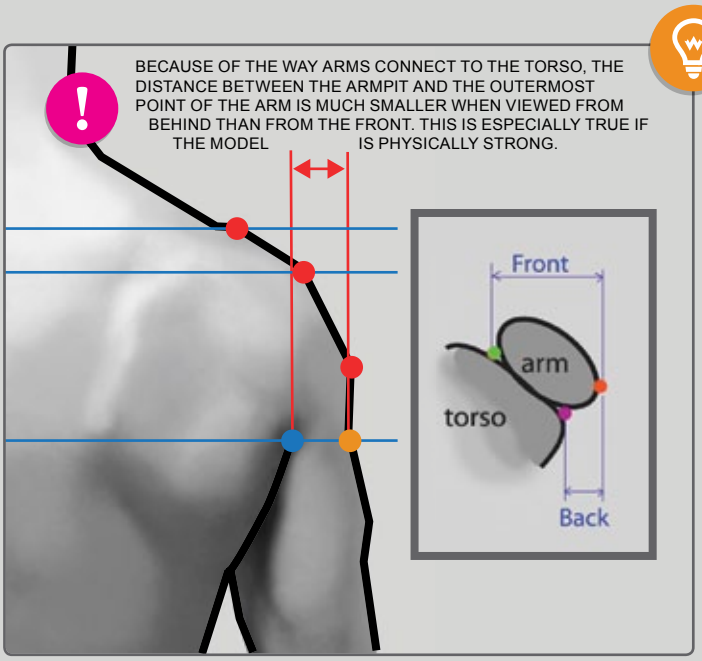
HOW ARMS CONNECT TO THE BODY







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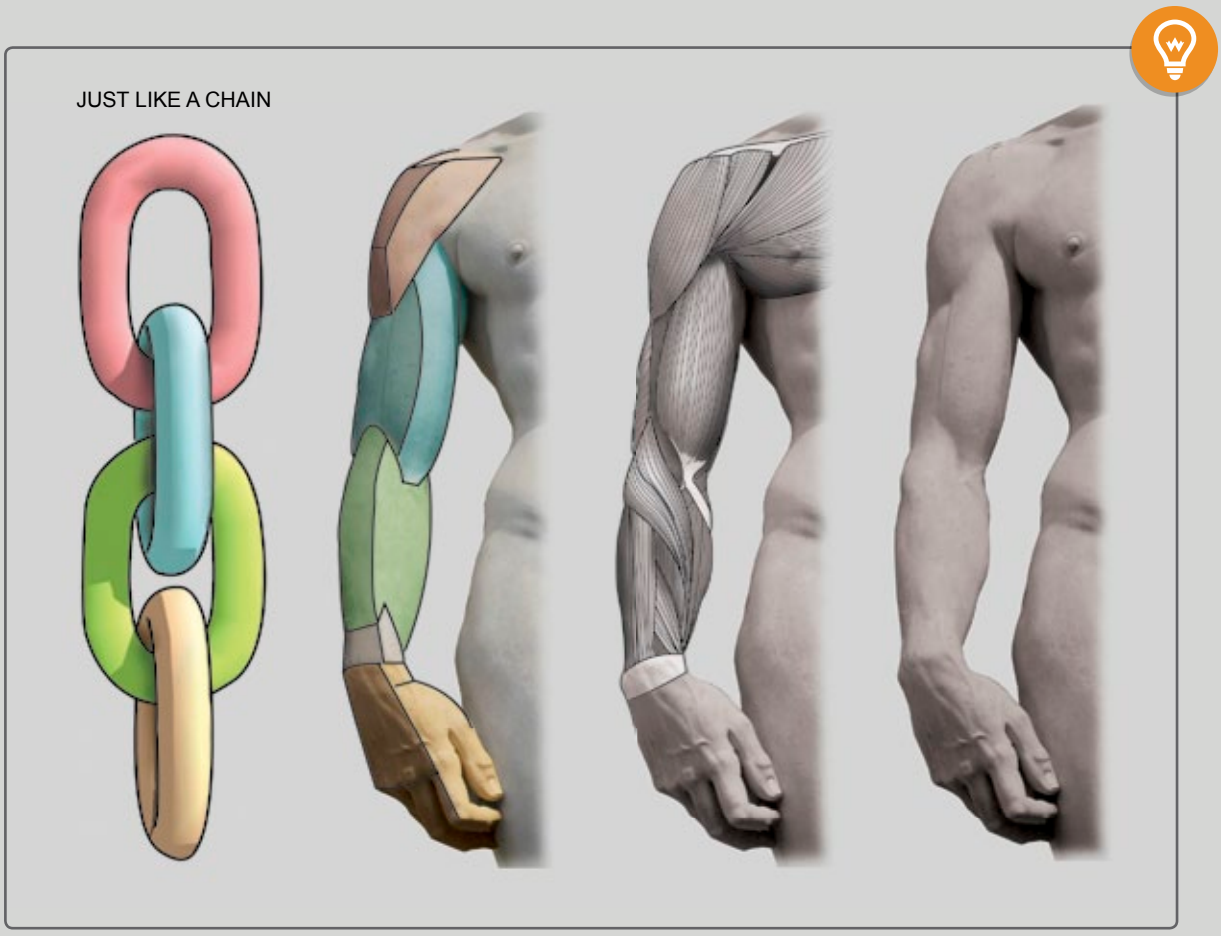
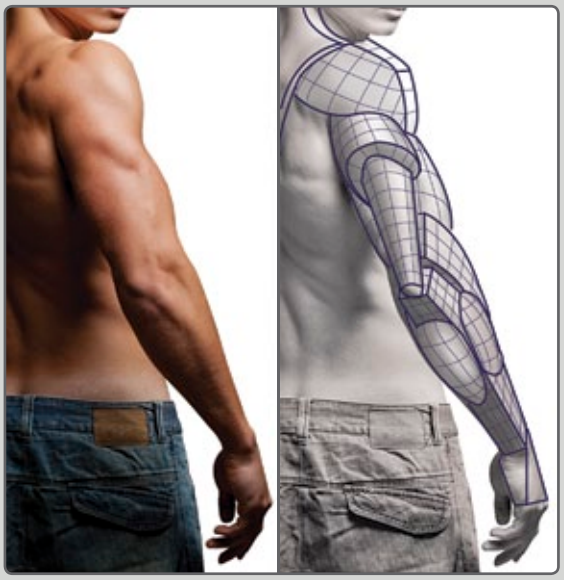
BLOCKING OUT A SEMIPRONATED ARM





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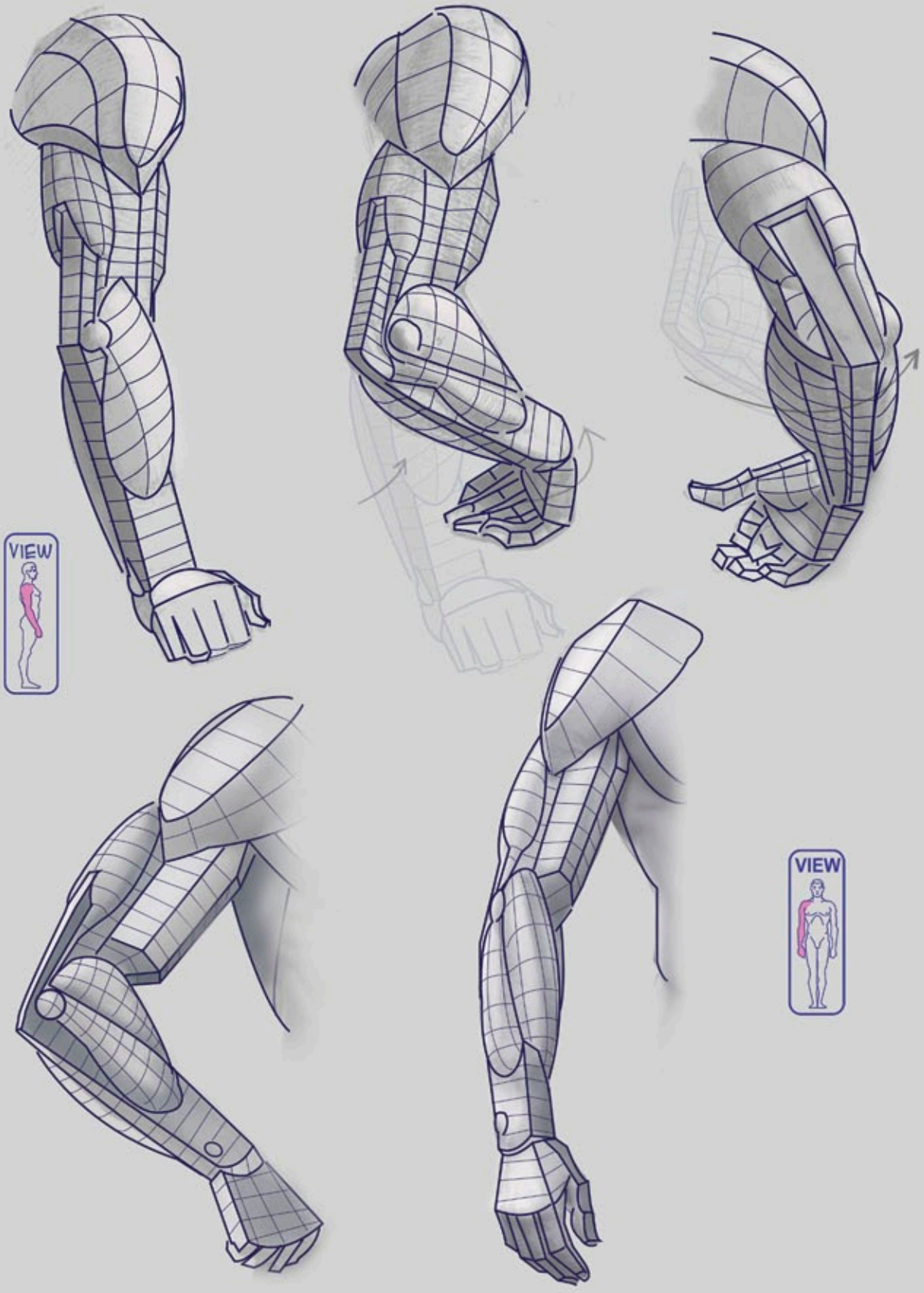
BLOCKING OUT AN ARM



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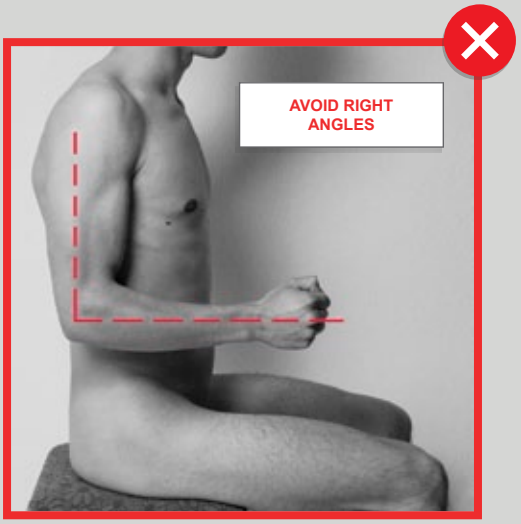
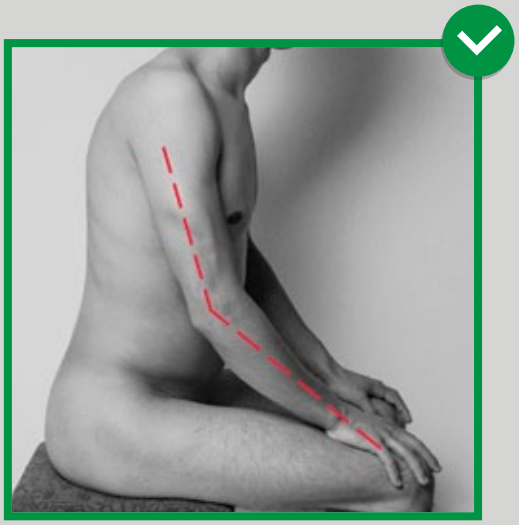
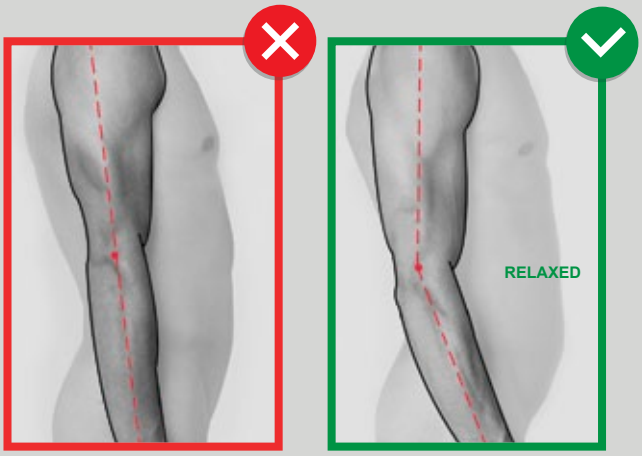
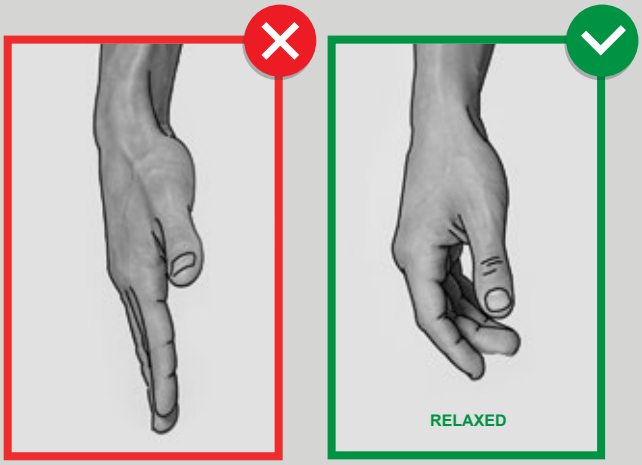
HOW DO YOU MAKE ARMS AND HANDS LOOK LESS STIFF?

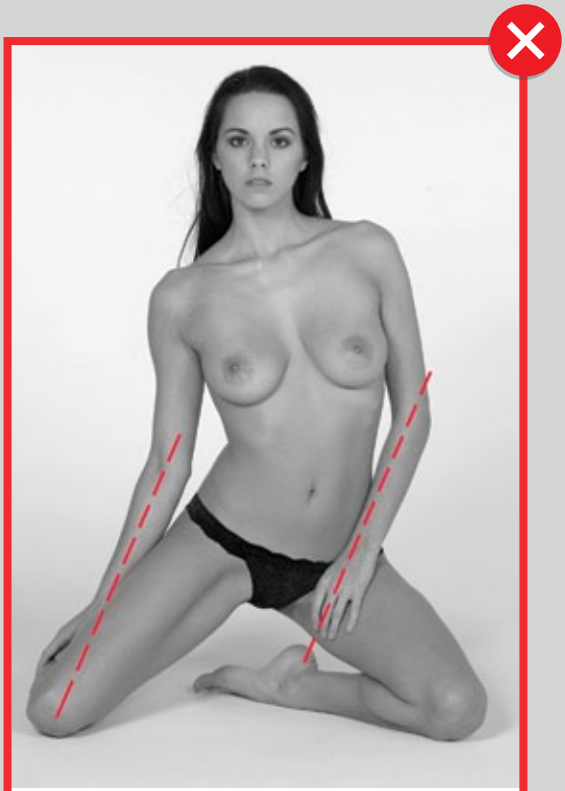




DON'T MAKE ARMS OR HANDS STRAIGHT WITHOUT SPECIAL REASON.







DON'T MAKE ARMS PARALLEL, IT WILL MAKE THE WHOLE FIGURE'S POSE LOOK UNNATURAL.

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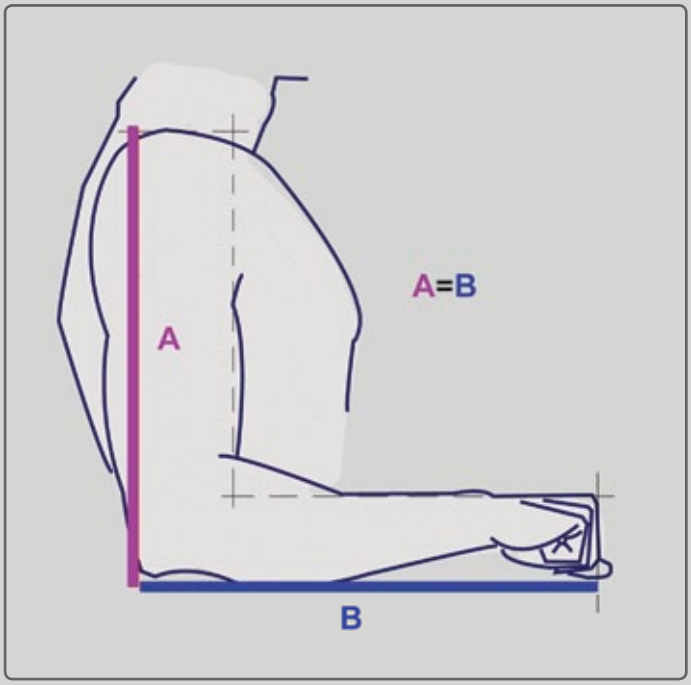
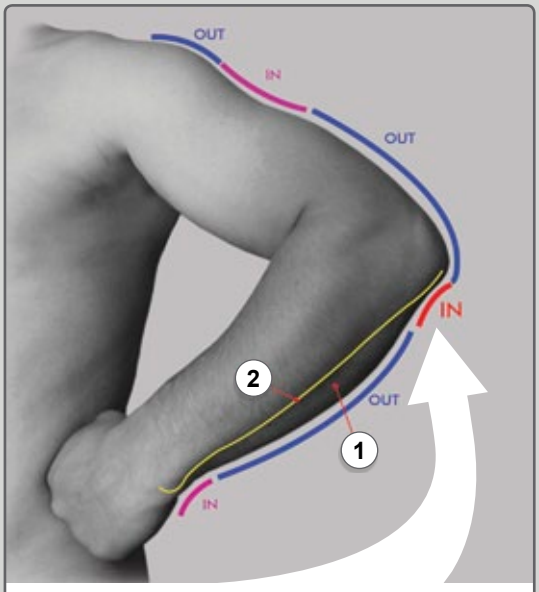
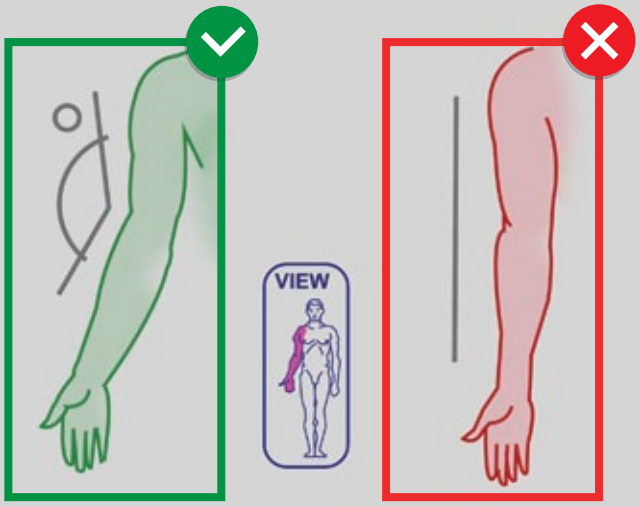
HANDY TIPS





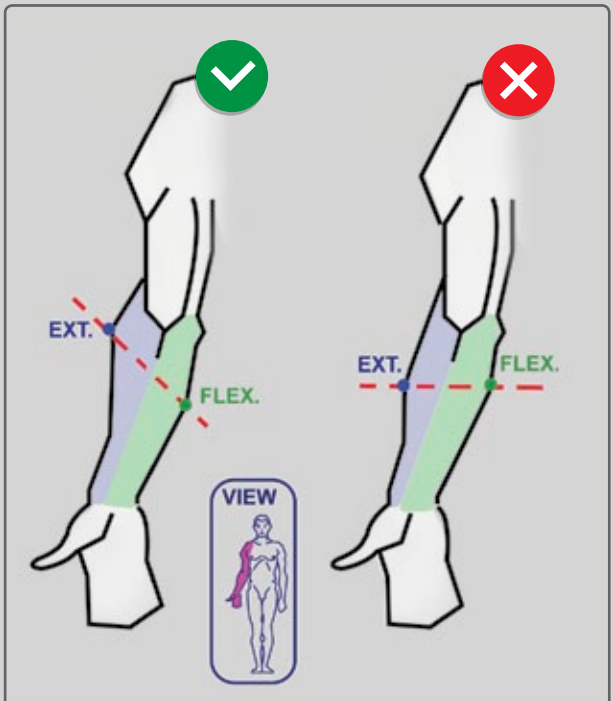
BODY SILHOUETTE APPEARS TO BEND **INWARD** RIGHT BELOW THE ELBOW DUE TO THE FLEXOR CARPI ULNARIS MUSCLE (1) POPPING **OUTWARD**.

ULNA BONE (2) REMAINS STRAIGHT.



WHEN ARMS ARE HELD OUT AT THE SIDES WITH PALMS FACING FORWARD (SUPINATION), FOREARM AND HAND ARE ABOUT 5 TO 15 DEGREES AWAY FROM THE BODY. THIS IS CALLED “THE CARRYING ANGLE”.

FEMALE ARMS HAVE A GREATER **C.A.**



THE HIGHEST POINT OF **THE EXTENSOR MUSCLES** IS LOCATED HIGHER THAN THE TOP POINT OF **THE FLEXOR MUSCLES**.

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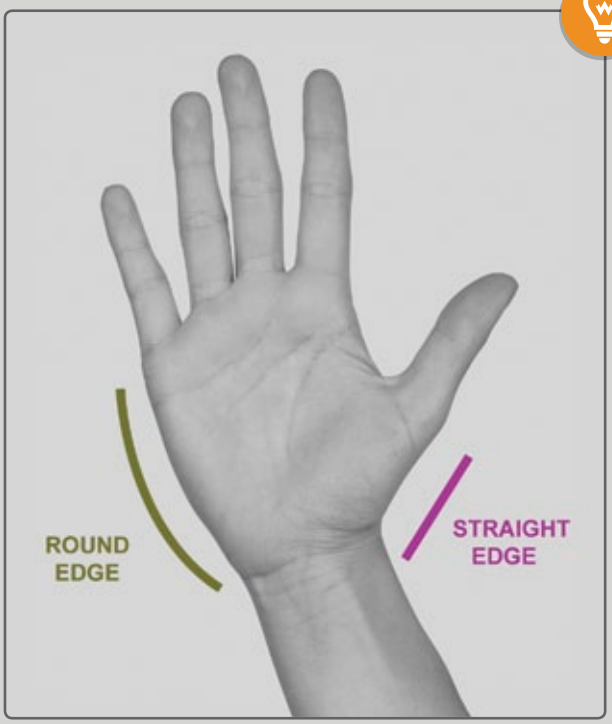
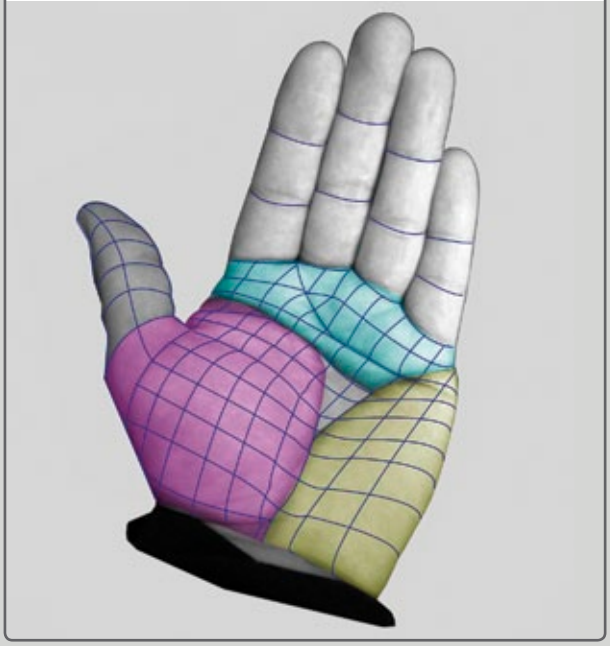
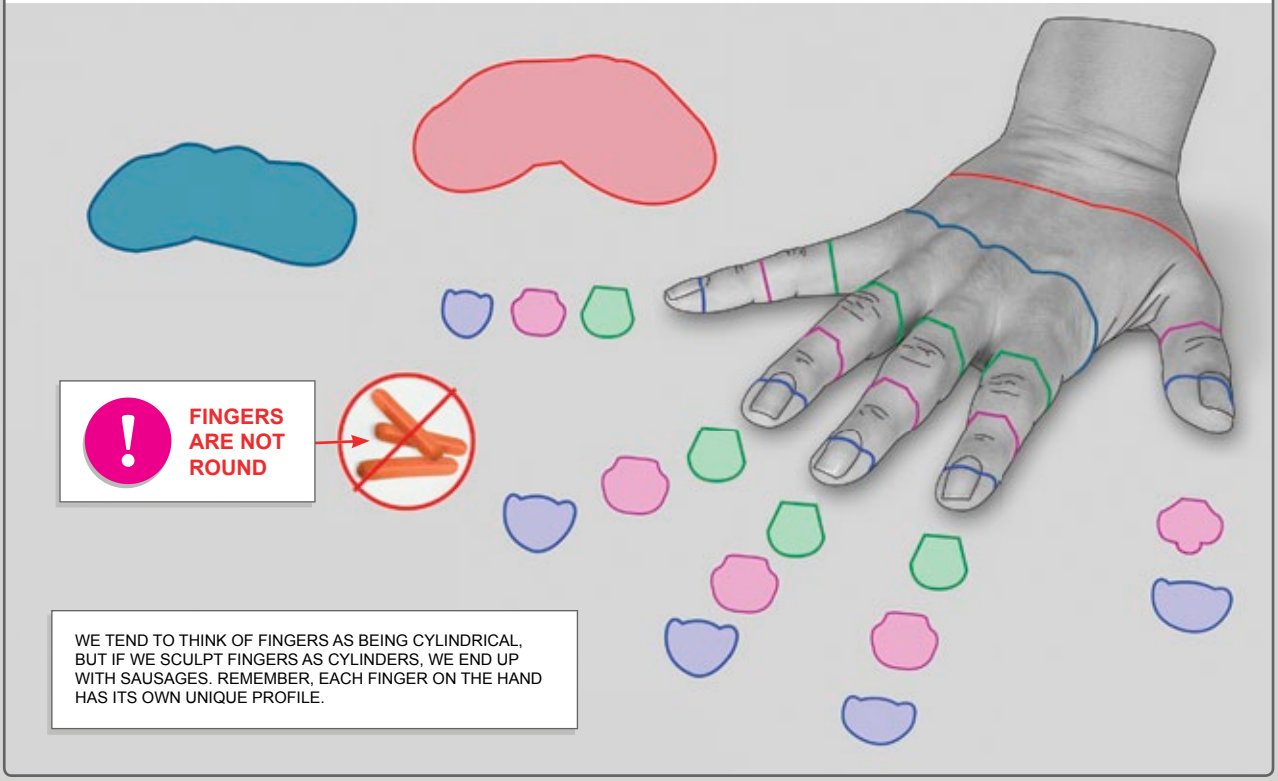
SHAPES OF THE HAND



PALM IS MADE OF 3 PADS



CROSS SECTIONS OF THE HAND



WE TEND TO THINK OF FINGERS AS BEING CYLINDRICAL, BUT IF WE SCULPT FINGERS AS CYLINDERS, WE END UP WITH SAUSAGES. REMEMBER, EACH FINGER ON THE HAND HAS ITS OWN UNIQUE PROFILE.

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IDEALIZED HAND PROPORTIONS

SIZE OF **AN ADULT'S** HAND

MAKE SURE YOU ARE MODELING THE HAND LARGE ENOUGH.

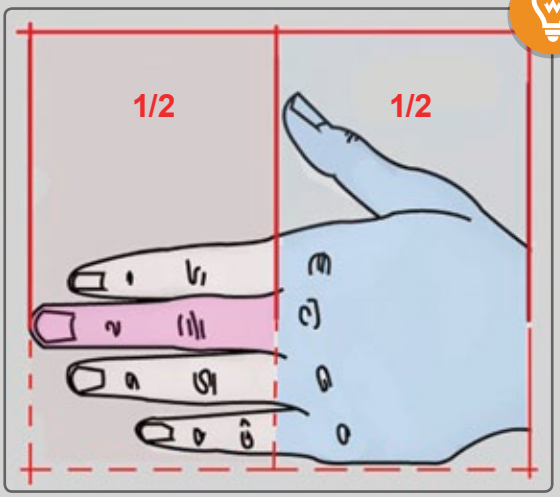
IDEALLY, HAND IS THE SAME SIZE AS FACE (FROM TIP OF CHIN TO HAIRLINE).

BABY

LENGTH OF HAND IS THE DISTANCE FROM CHIN TO EYEBROW LINE.

TEEN

LENGTH OF HAND IS THE DISTANCE FROM CHIN TO THE MIDDLE OF FOREHEAD.



THERE ARE TWO METHODS YOU CAN USE TO CALCULATE FINGER LENGTH.

1st METHOD

C — C = 75% of B

B — B = 75% of A

A — .....

2nd METHOD (9+1/4 parts)

C — 1, 2 — 2 parts + (1/4 of parts)

B — 1, 2, 3 — 3 parts

A — 1, 2, 3, 4 — 4 parts

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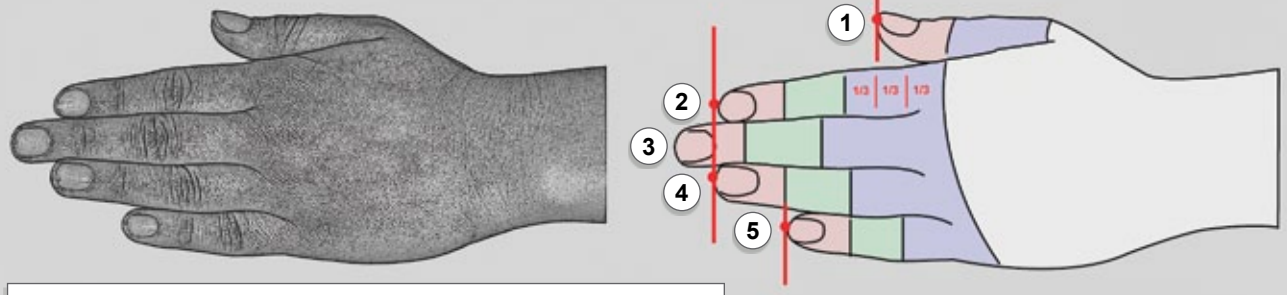
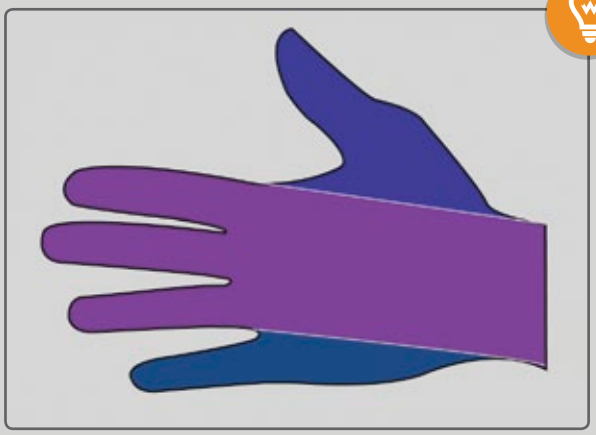
HAND

FINGER LENGTHS OF AN IDEALIZED HAND

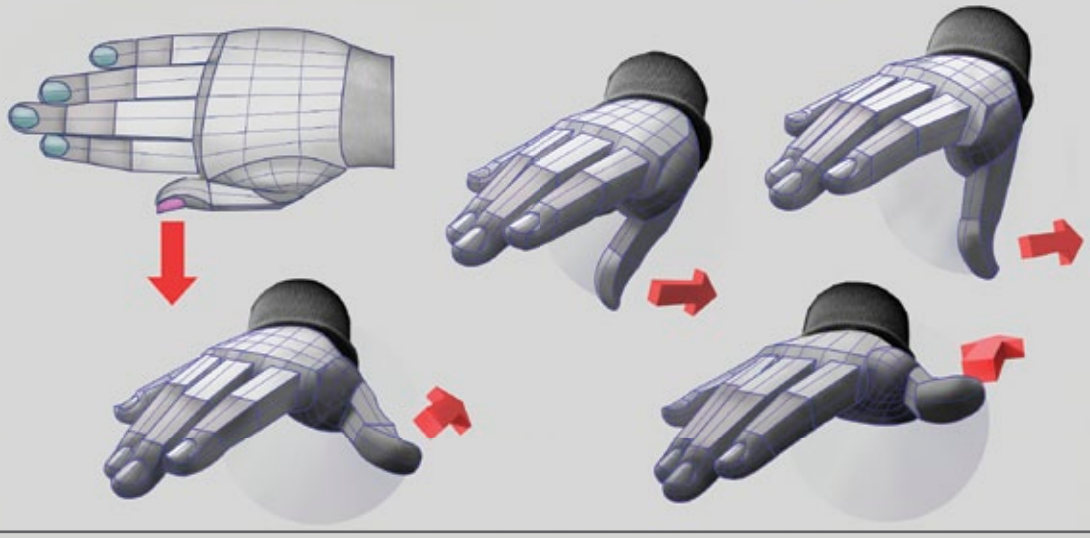


(1) THUMB DOES NOT POSSESS **A MIDDLE (INTERMEDIATE)** PHALANX!
(2)(3)(4)(5) FINGERS CONSIST OF 3 PHALANGES: **PROXIMAL**, **MIDDLE** AND **DISTAL**.

(2) = (4)



THUMB NAIL FACES A DIFFERENT DIRECTION THAN OTHER NAILS.



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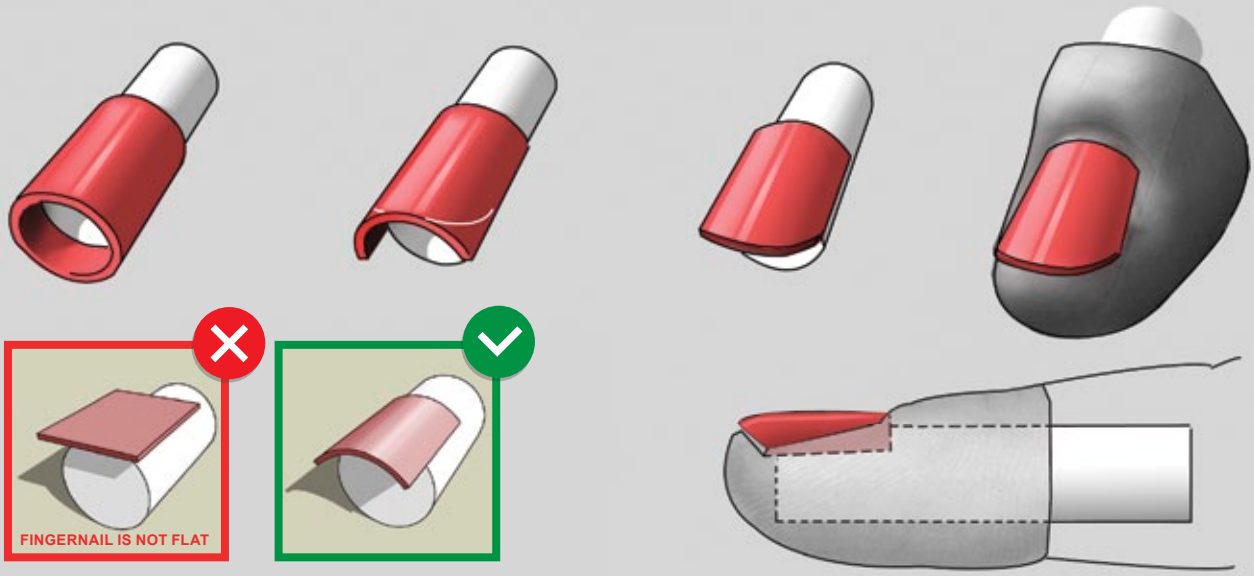
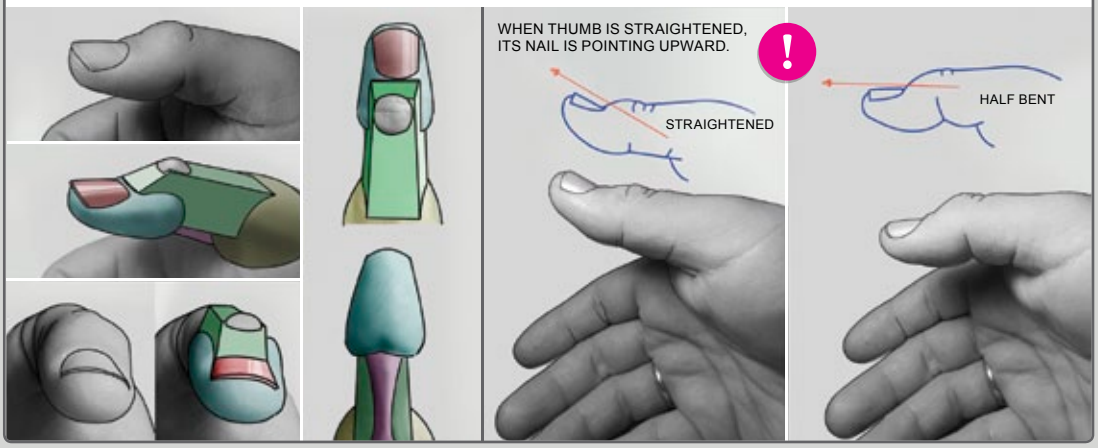
SHAPING HAND AND FINGERS

IT IS MUCH EASIER TO BEGIN MODELING FINGERS FROM SIMPLE SQUARE FORMS.

FINGERNAIL



THUMB IS SHAPED DIFFERENTLY THAN OTHER FINGERS.



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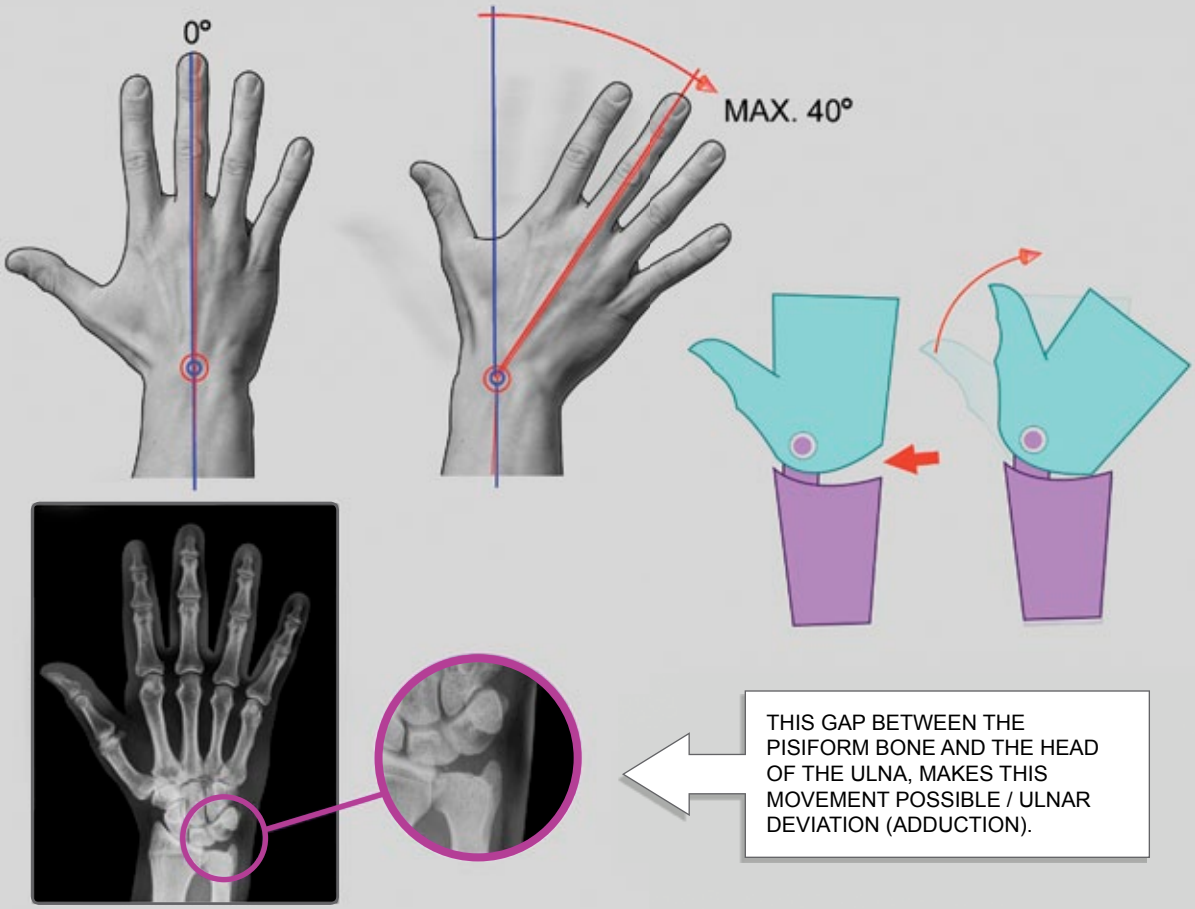
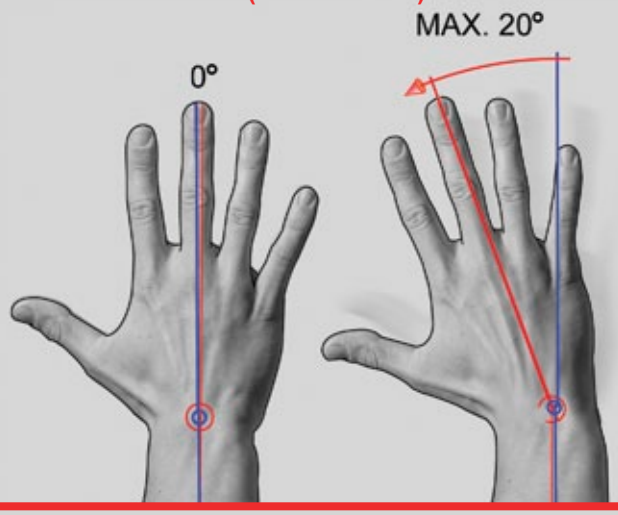
HAND MOVEMENTS

ULNAR DEVIATION (ADDUCTION)



THIS GAP BETWEEN THE PISIFORM BONE AND THE HEAD OF THE ULNA, MAKES THIS MOVEMENT POSSIBLE / ULNAR DEVIATION (ADDUCTION).

RADIAL DEVIATION (ABDUCTION)



IT'S AN UNNATURAL MOTION: THERE AREN'T ANY MUSCLES DESIGNED SPECIFICALLY TO DO THIS MOVEMENT, SO THE EFFORT COMES FROM THE FLEXOR AND EXTENSOR TENDONS. **WOULD BE BETTER TO AVOID SCULPTING THIS HAND POSITION!**

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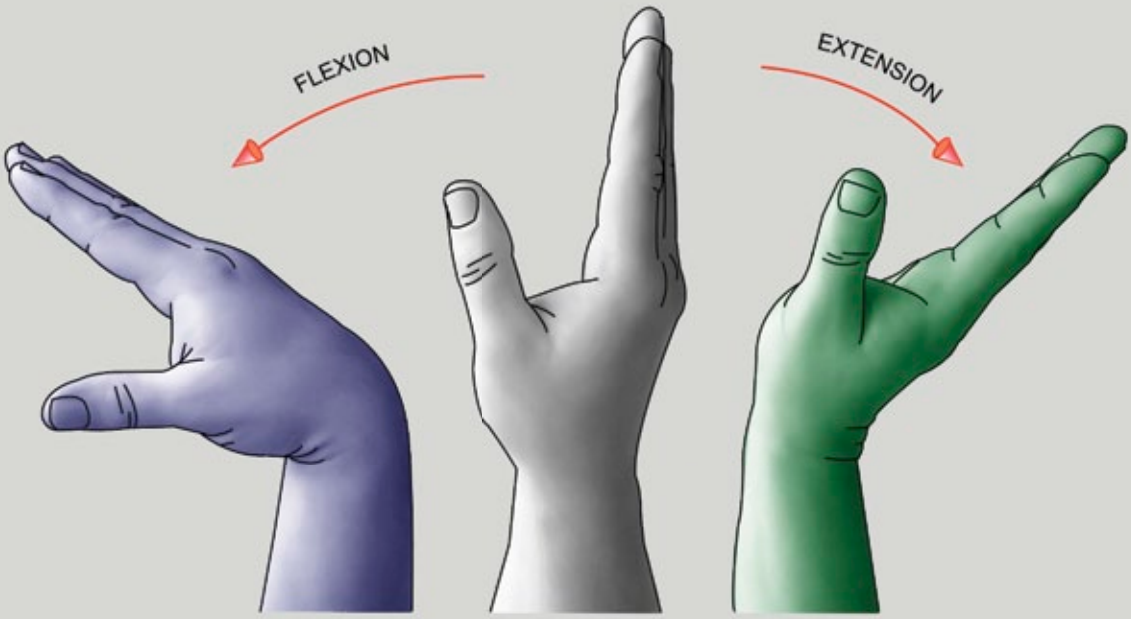
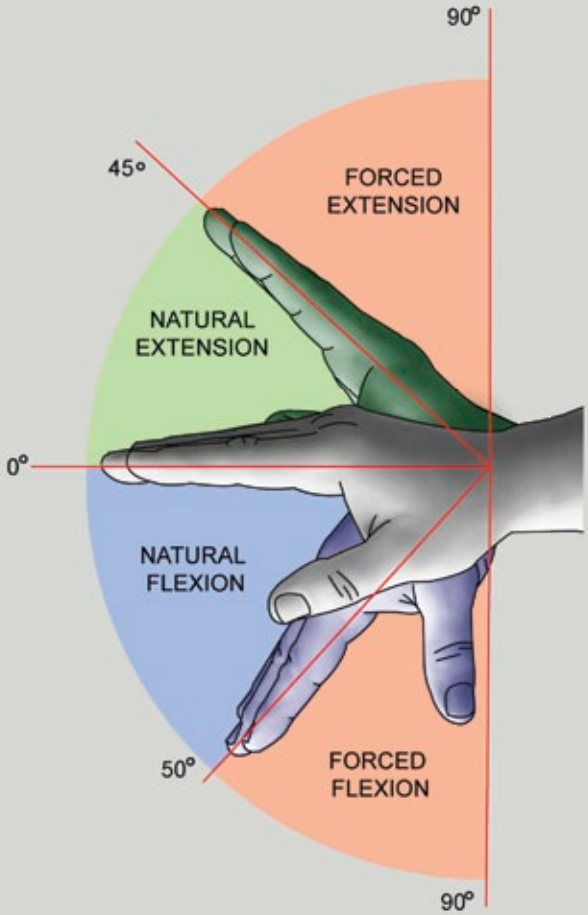
WRIST POSITIONS





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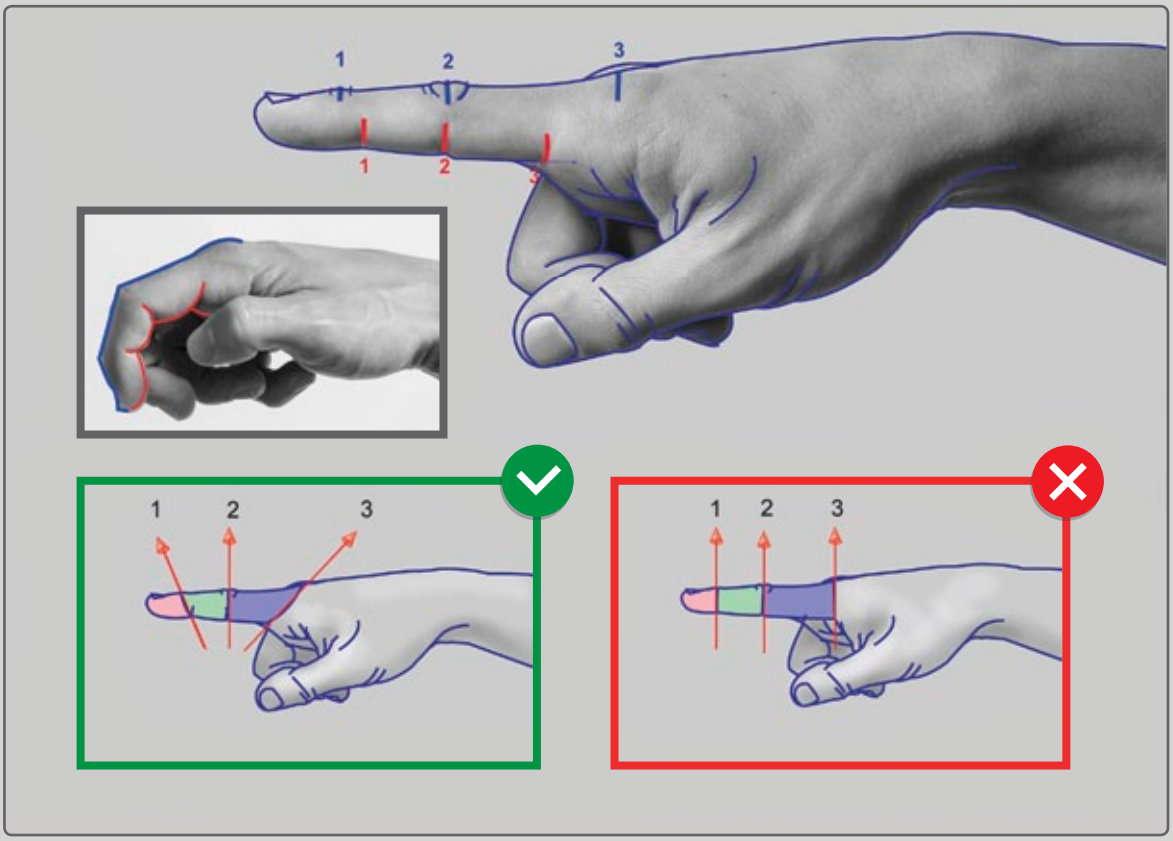
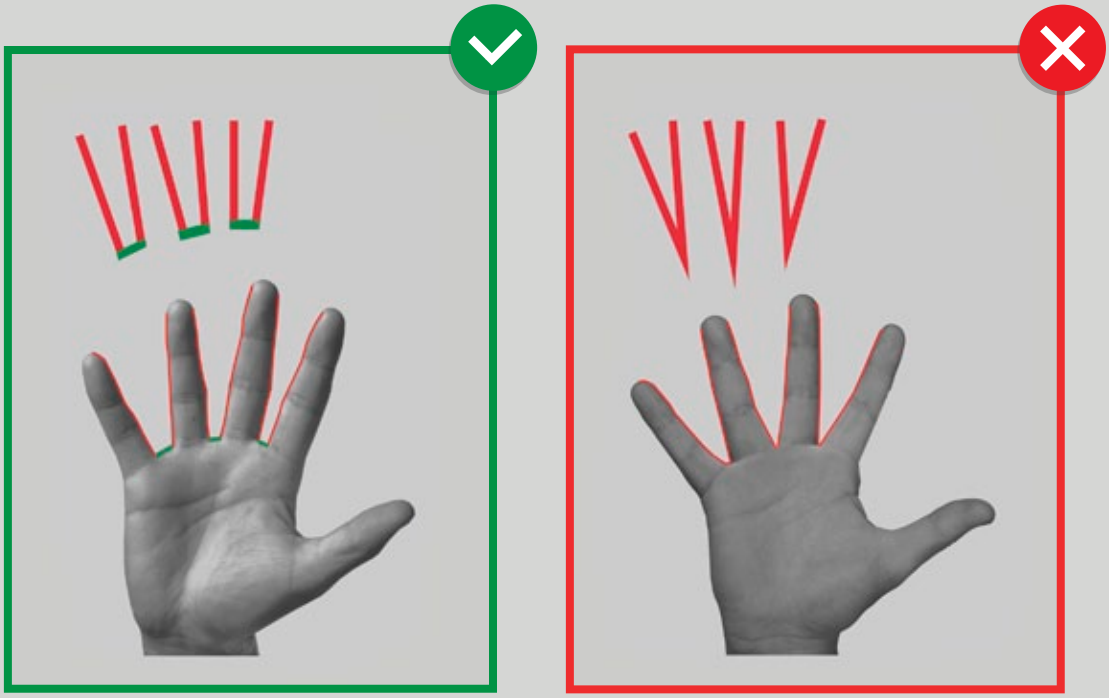
CREASES AND GAPS OF FINGERS





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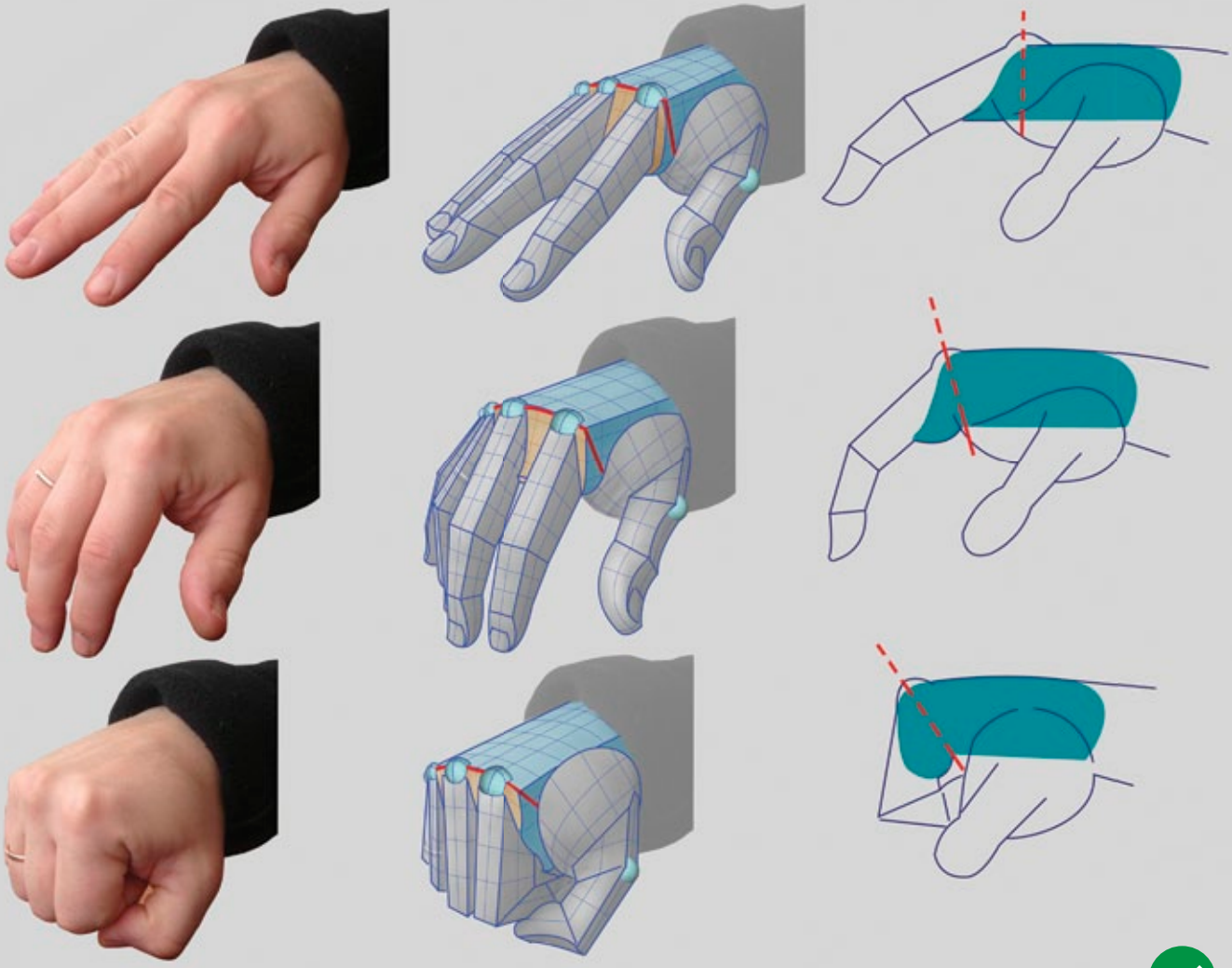
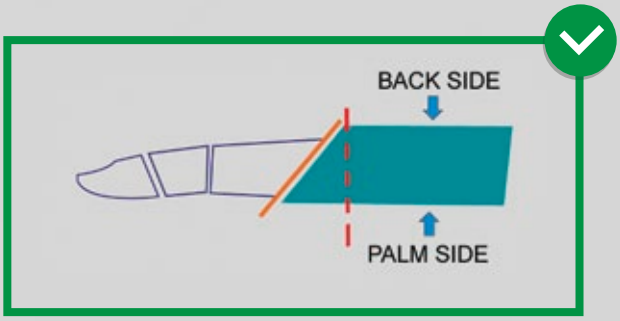
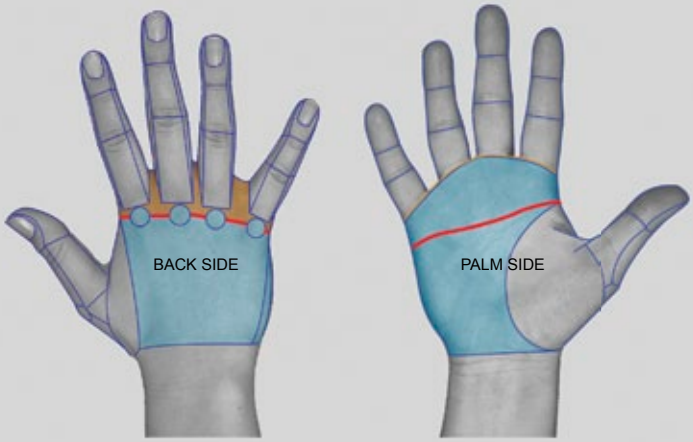
BENDING AND CONNECTION LINE OF FINGERS

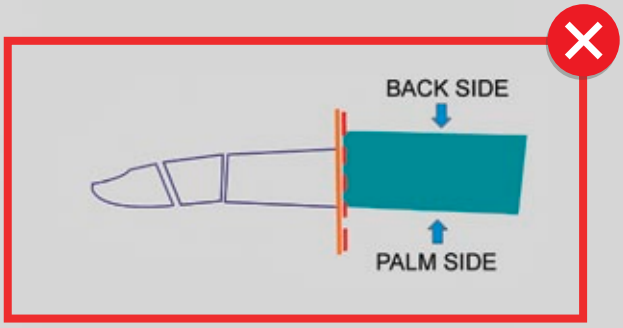


FINGERS ARE SHORTER FROM PALM SIDE OF THE HAND.

CREASE LINE ON THE PALM DOES NOT MATCH UP WITH **CONNECTION LINE** WHERE FINGERS JOIN **THE BODY OF THE HAND**.







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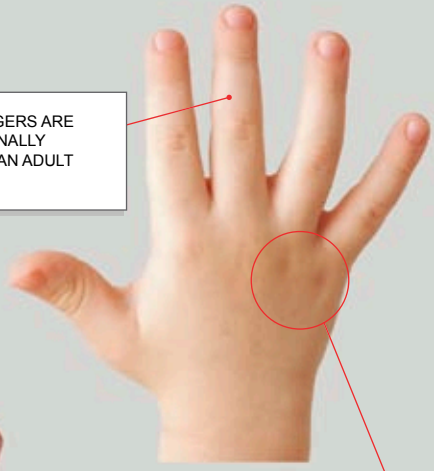
HOW HANDS AGE

NEWBORN – HANDS OF A NEWBORN ARE WRINKLED.

NEWBORN

CHILD – FINGERS ARE PROPORTIONALLY THICKER THAN ADULT FINGERS.

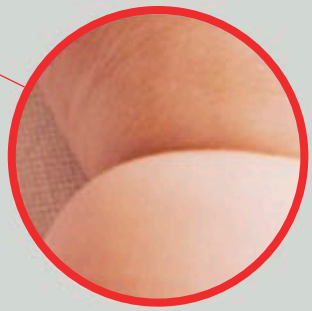


CHILD

CHILD – STILL SOME DIMPLES.

BABY

BABY – SOME OF THE SIGNS THAT A CHILD IS STILL A BABY ARE CHUBBY WRISTS AND KNUCKLE DIMPLES. THE SAME INDENTATIONS ARE ALSO ON THE ELBOWS AND KNEES.



ADULT – LESS FAT .

ADULT

SENIOR – ALMOST NO FAT, LOOSE SKIN.

SENIOR

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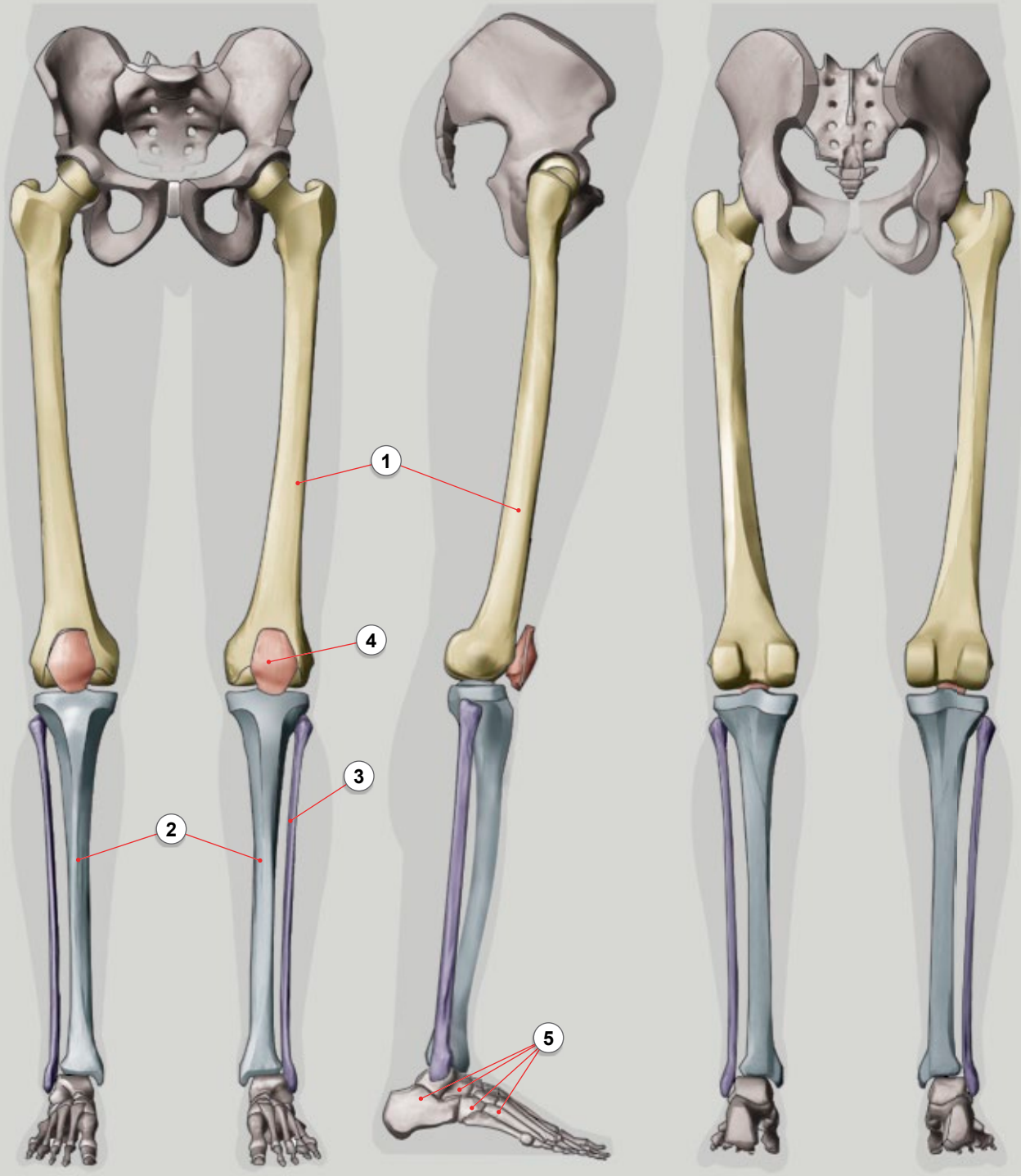
BONES OF LOWER LIMB



1 FEMUR
2 TIBIA
3 FIBULA
4 KNEE CAP (patella)
5 BONES OF THE FOOT

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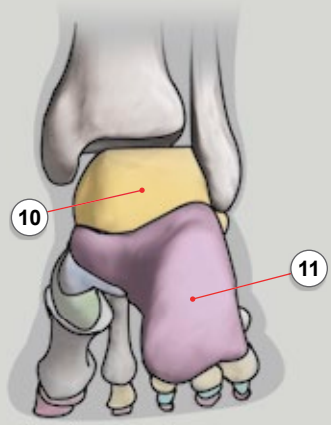
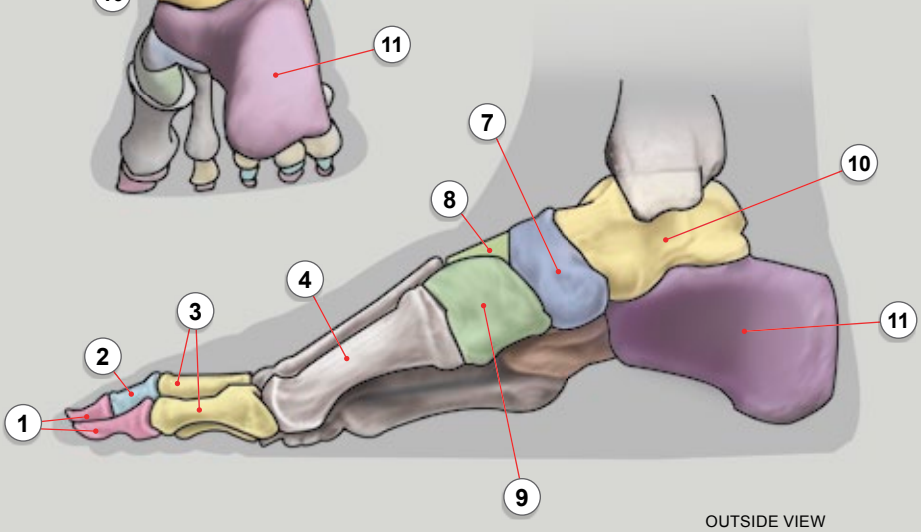
BONES OF THE FOOT

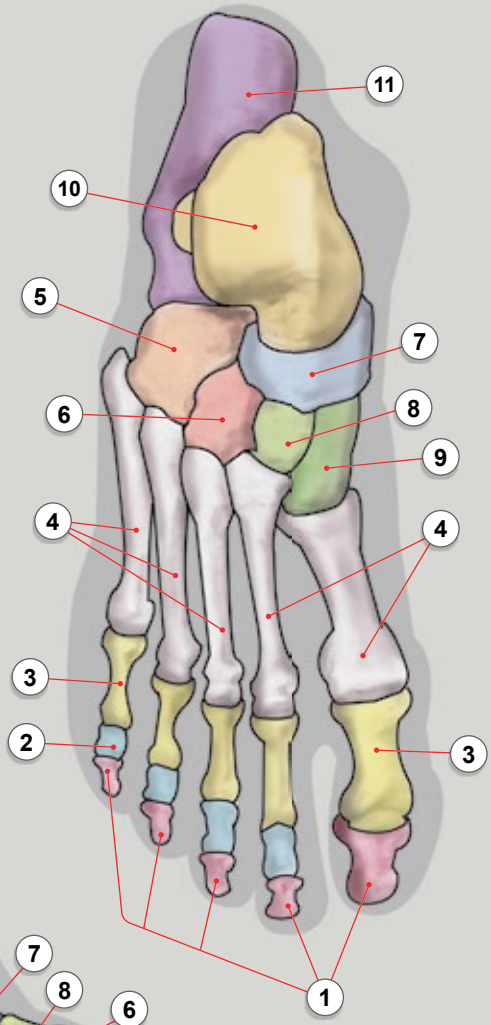
BACK VIEW



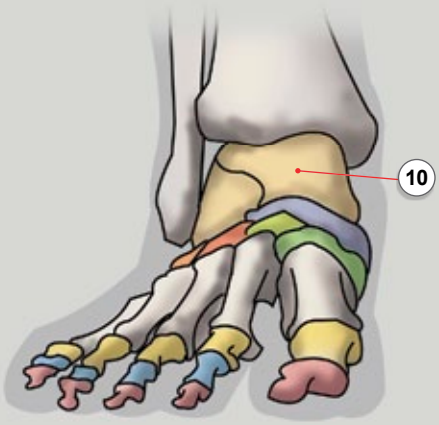
INSIDE VIEW



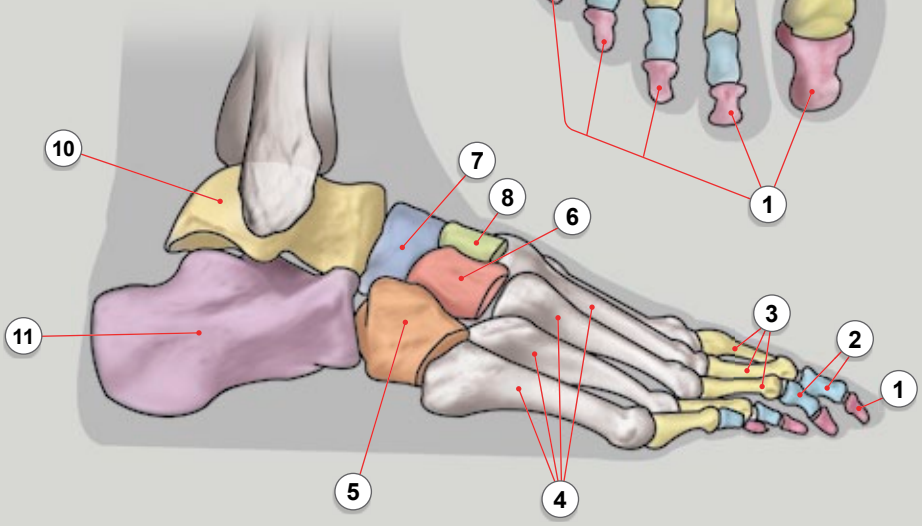
TOP VIEW



FRONT VIEW



OUTSIDE VIEW



1	DISTAL PHALANGES	5	CUBOID	9	MEDIAL CUNEIFORM
2	MIDDLE PHALANGES	6	LATERAL CUNEIFORM	10	TALUS
3	PROXIMAL PHALANGES	7	NAVICULAR	11	HEEL BONE (calcaneus)
4	METATARSAL BONES	8	INTERMEDIATE CUNEIFORM		

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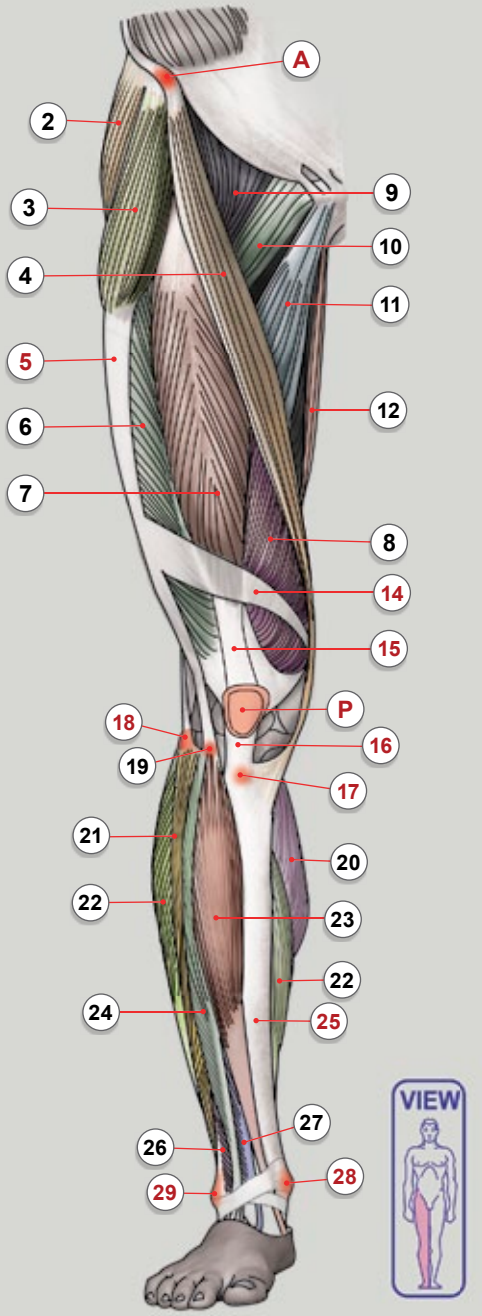
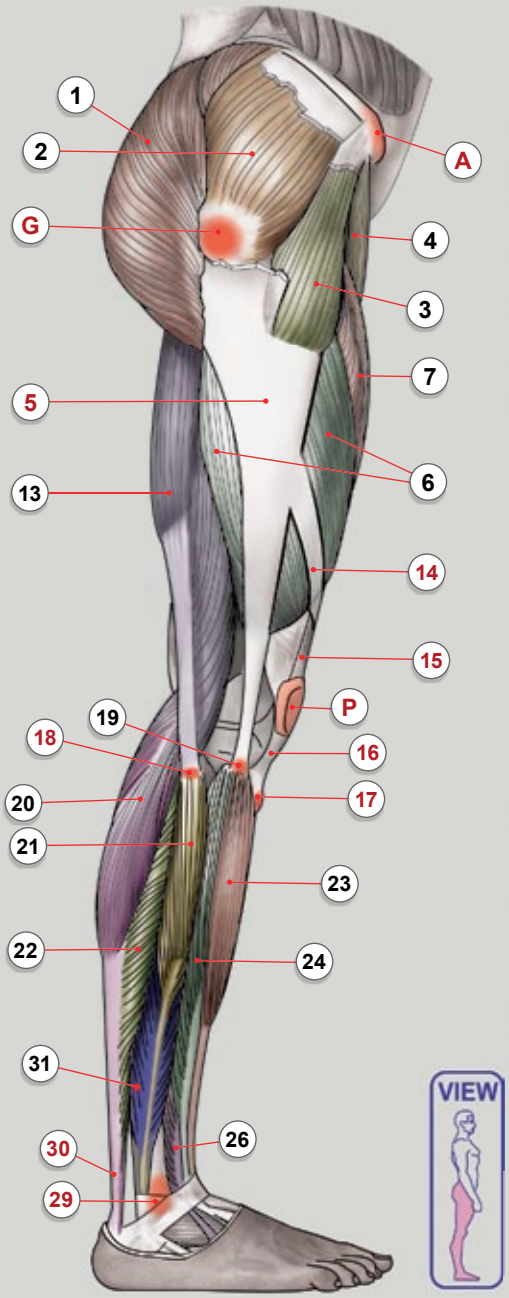
MUSCLES OF LOWER LIMB





A	A.S.I.S.	5	ILIOTIBIAL BAND	12	GRACILIS
G	GREATER TROCHANTER	6	VASTUS LATERALIS	13	BICEPS FEMORIS
P	KNEE CAP (PATELLA)	7	RECTUS FEMORIS	14	RICHER'S BAND
1	GLUTEUS MAXIMUS	8	VASTUS MEDIALIS	15	QUADRICEPS TENDON
2	GLUTEUS MEDIUS	9	ILIOPSOAS	16	PATELLAR LIGAMENT
3	TENSOR FASCIAE LATAE	10	PECTINEUS	17	TIBIAL TUBEROSITY
4	SARTORIUS	11	ADDUCTOR LONGUS	18	HEAD OF FIBULA

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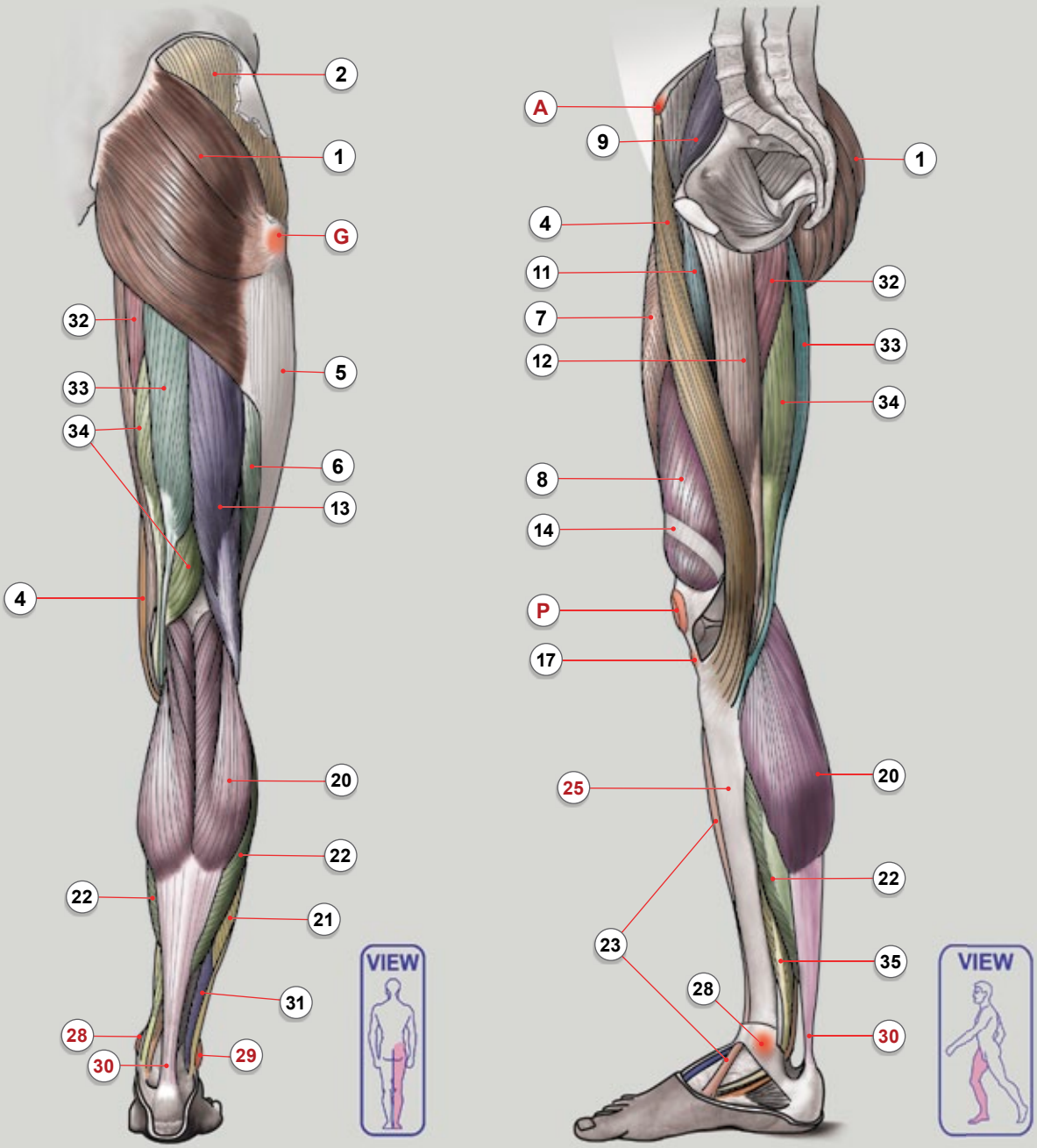
MUSCLES OF LOWER LIMB



19	LATERAL TIBIAL CONDYLE	25	MEDIAL SURFACE OF TIBIA	31	PERONEUS BREVIS
20	GASTROCNEMIUS	26	PERONEUS TERTIUS	32	ADDUCTOR MAGNUS
21	PERONEUS LONGUS	27	EXTENSOR HALLUCIS LONGUS	33	SEMITENDINOSUS
22	SOLEUS	28	MEDIAL ANKLE (M. MALLEOLUS)	34	SEMIMEMBRANOSUS
23	TIBIALIS ANTERIOR	29	LATERAL ANKLE (L. MALLEOLUS)	35	FLEXOR DIGITORUM LONGUS
24	EXTENSOR DIGITORUM LONGUS	30	ACHILLES TENDON		

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3D SCAN OF RIGHT LEG

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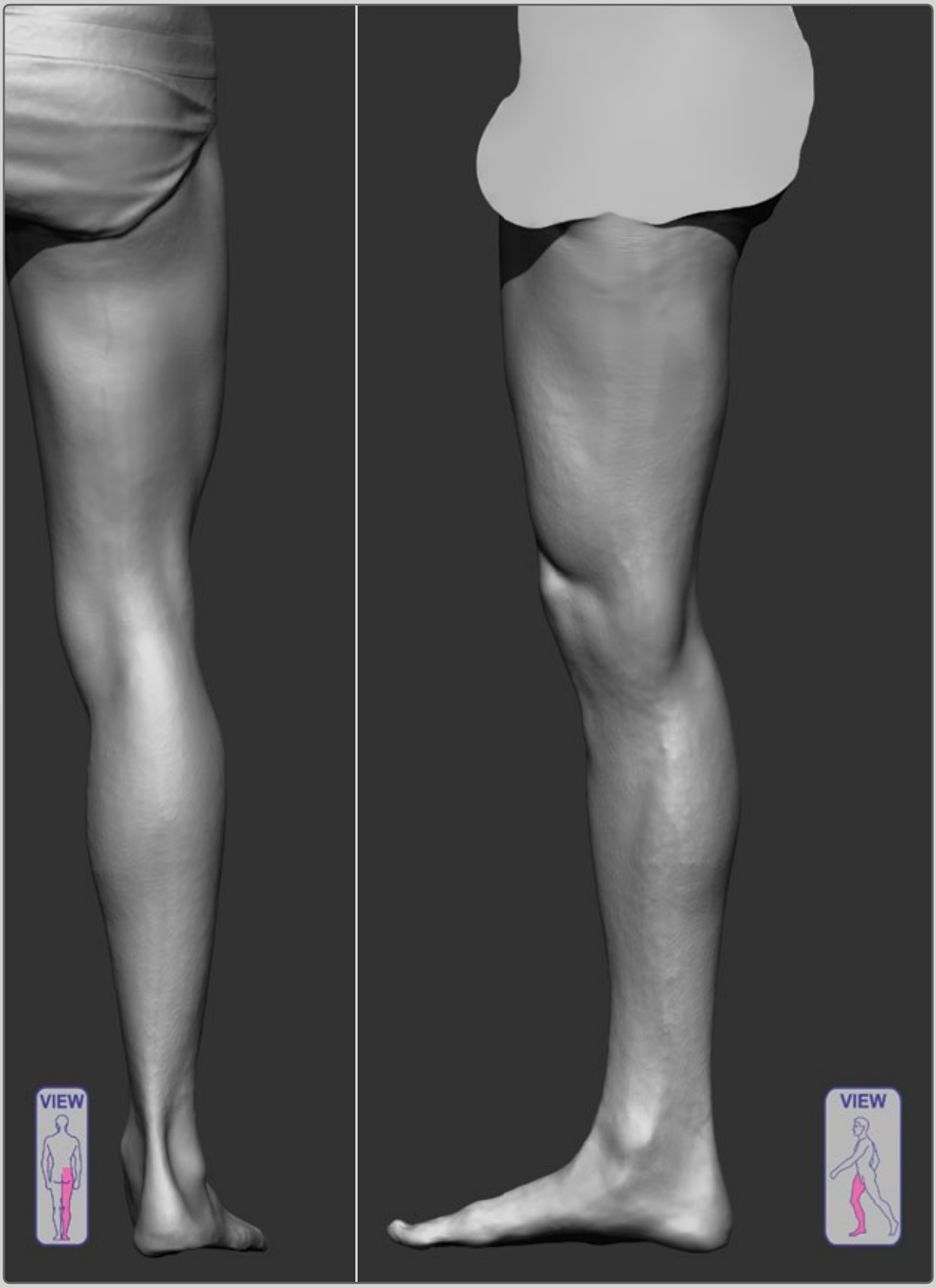
3D SCAN OF RIGHT LEG



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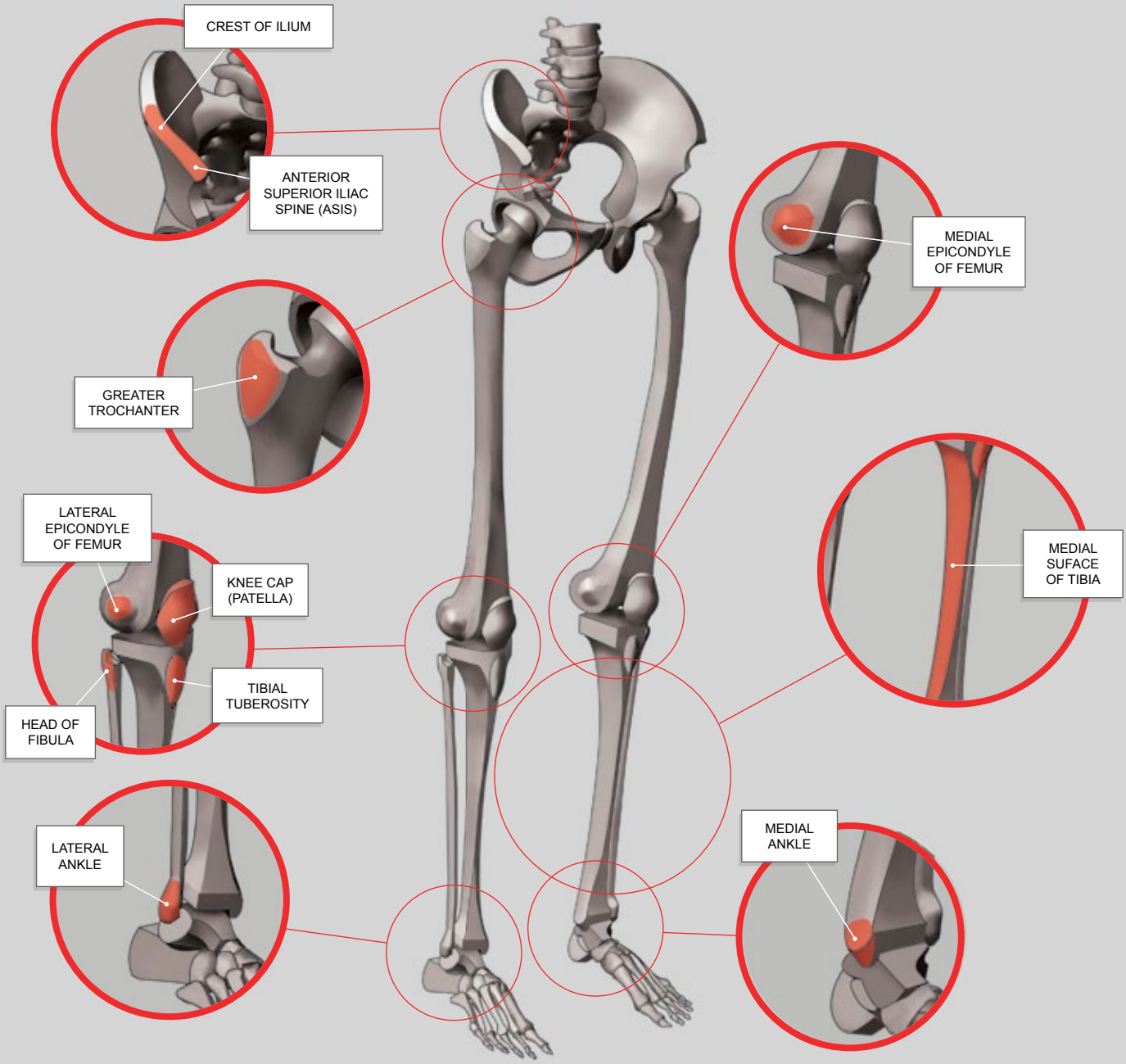
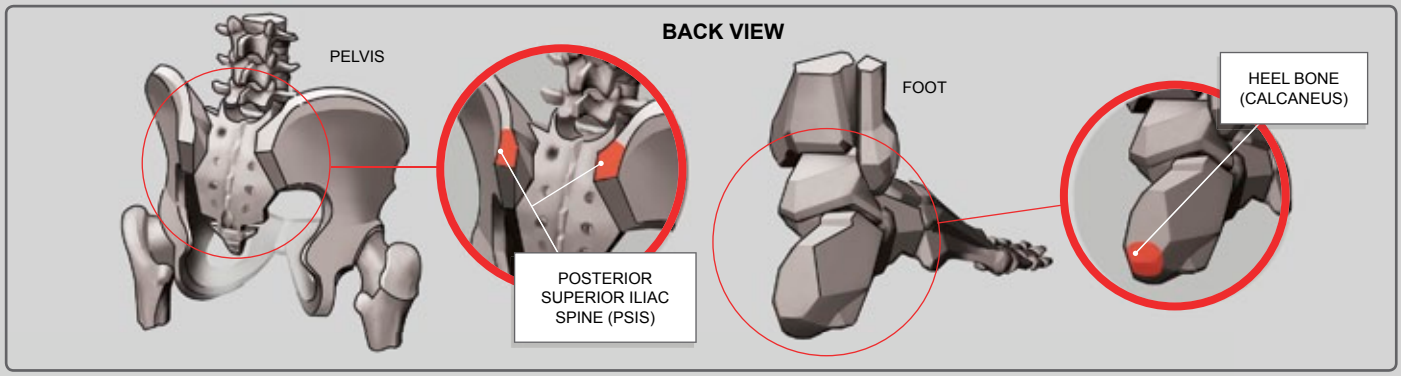
BONY LANDMARKS OF LOWER LIMB





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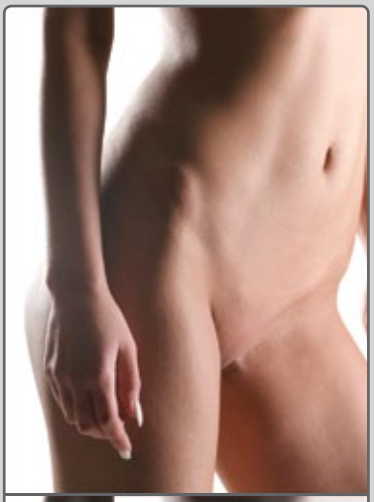
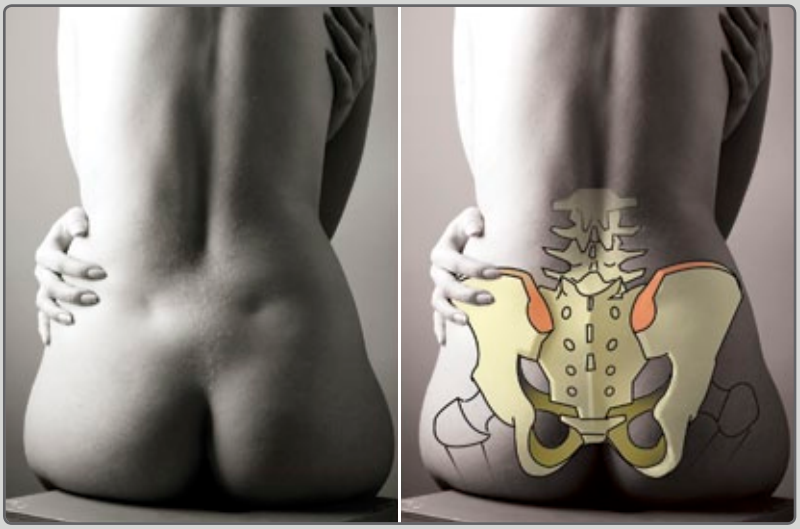
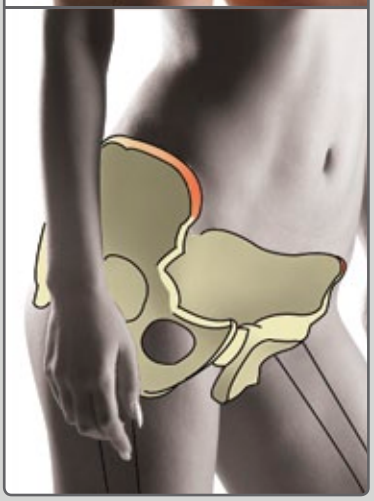
BONY LANDMARKS OF PELVIS







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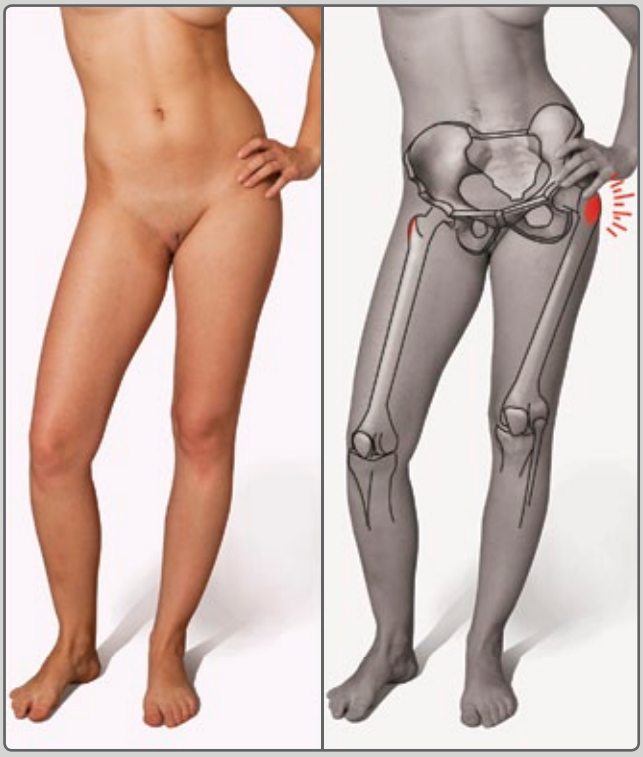
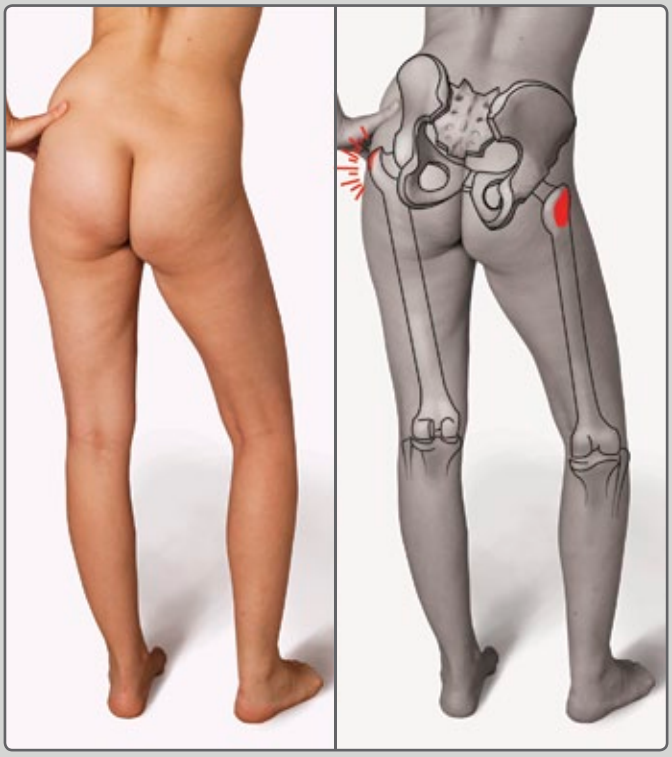
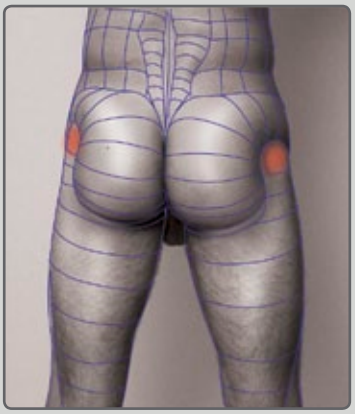
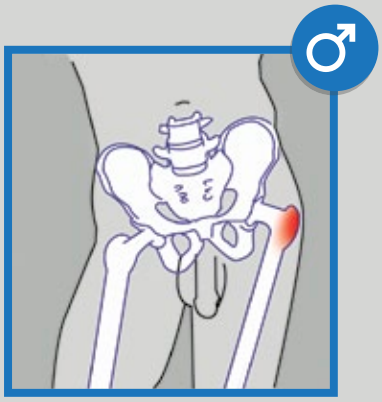
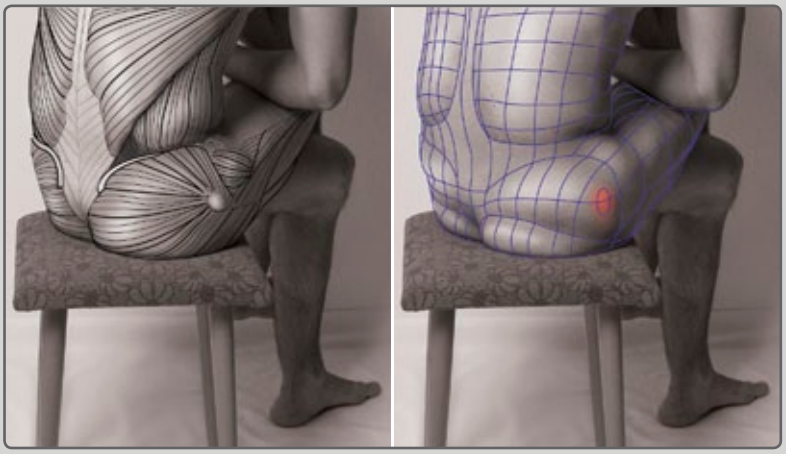
BONY LANDMARKS OF LOWER LIMB
GREATER TROCHANTER

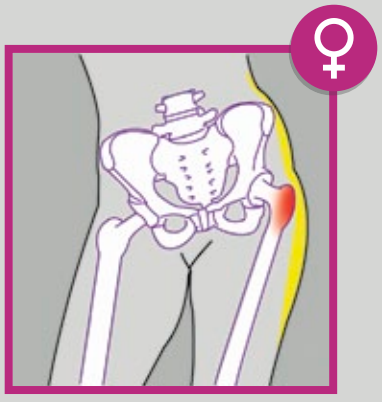












IN FEMALE HIPS, **SUBCUTANEOUS FAT** COVERS **GT** AT THE TOP OF FEMUR AND THEREFORE MAKES IT LESS PROMINENT.

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MALE LEG SHAPES

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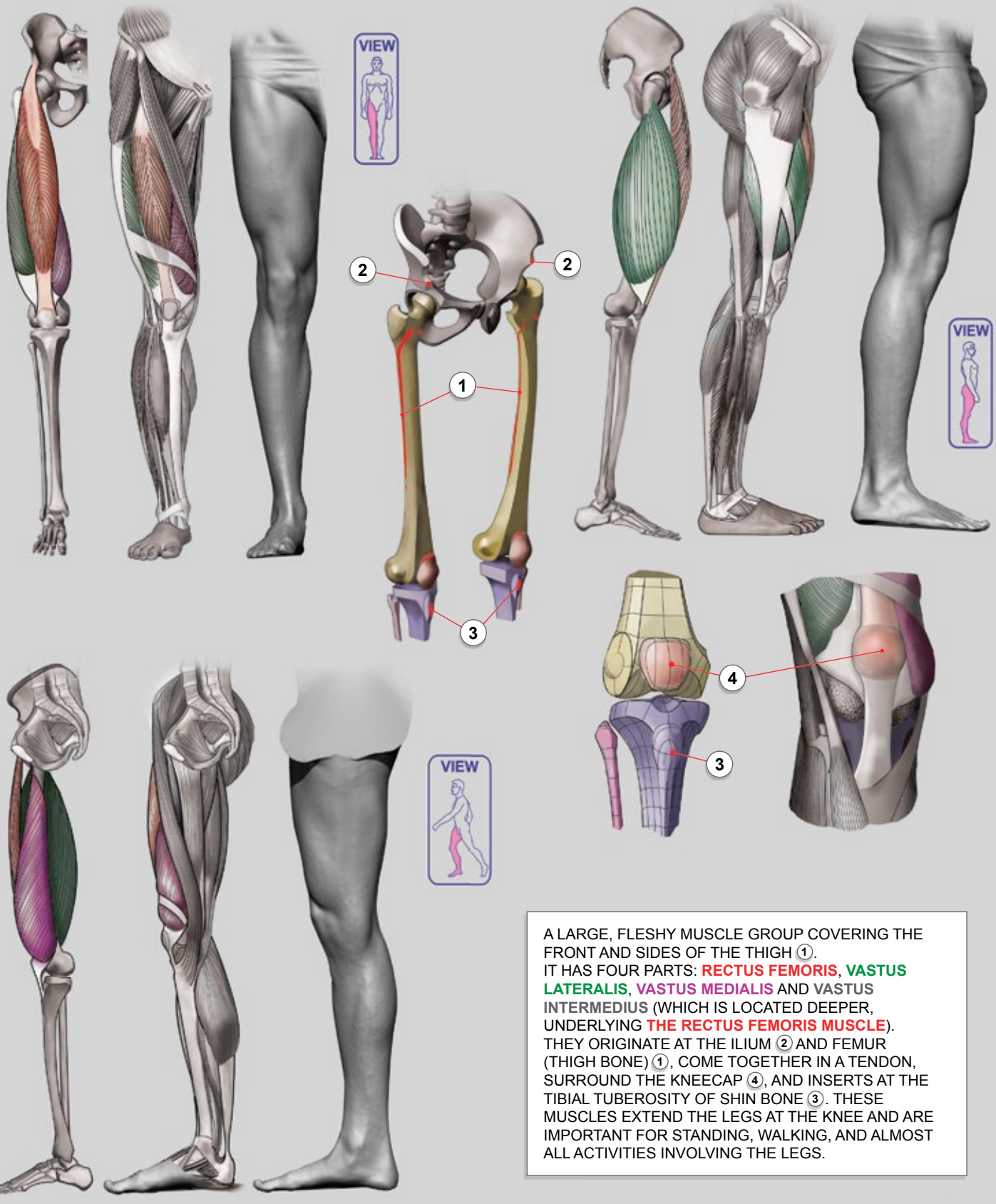
QUADS

(QUADRICEPS FEMORIS MUSCLE)



A LARGE, FLESHY MUSCLE GROUP COVERING THE FRONT AND SIDES OF THE THIGH (1).
IT HAS FOUR PARTS: **RECTUS FEMORIS**, **VASTUS LATERALIS**, **VASTUS MEDIALIS** AND **VASTUS INTERMEDIUS** (WHICH IS LOCATED DEEPER, UNDERLYING **THE RECTUS FEMORIS MUSCLE**).
THEY ORIGINATE AT THE ILIUM (2) AND FEMUR (THIGH BONE) (1), COME TOGETHER IN A TENDON, SURROUND THE KNEECAP (4), AND INSERTS AT THE TIBIAL TUBEROSITY OF SHIN BONE (3). THESE MUSCLES EXTEND THE LEGS AT THE KNEE AND ARE IMPORTANT FOR STANDING, WALKING, AND ALMOST ALL ACTIVITIES INVOLVING THE LEGS.

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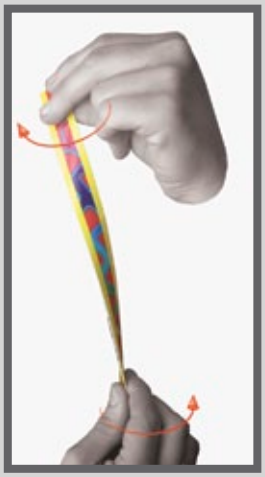
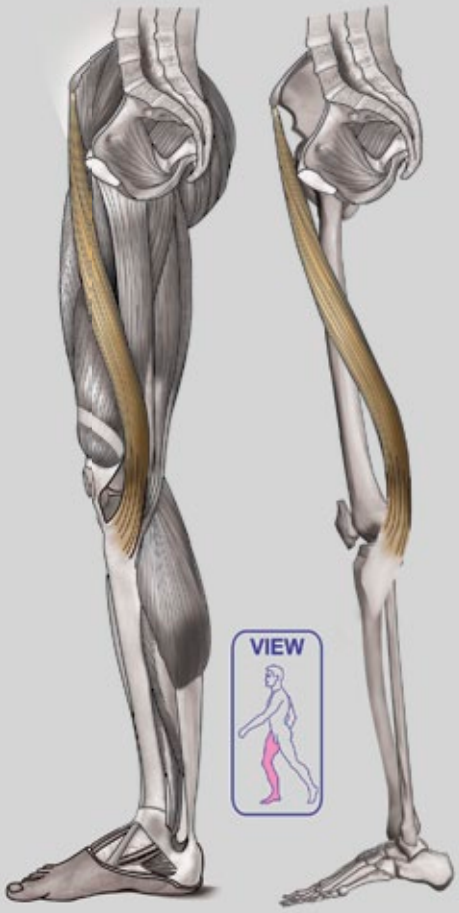
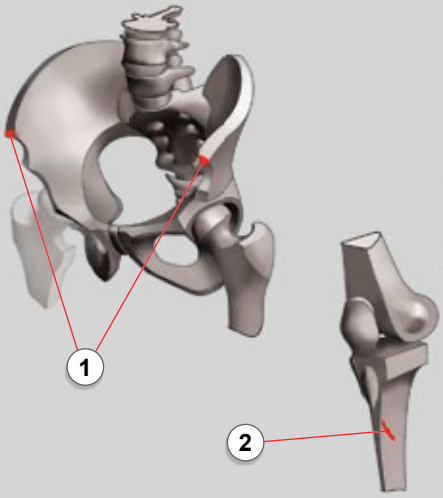
SARTORIUS MUSCLE





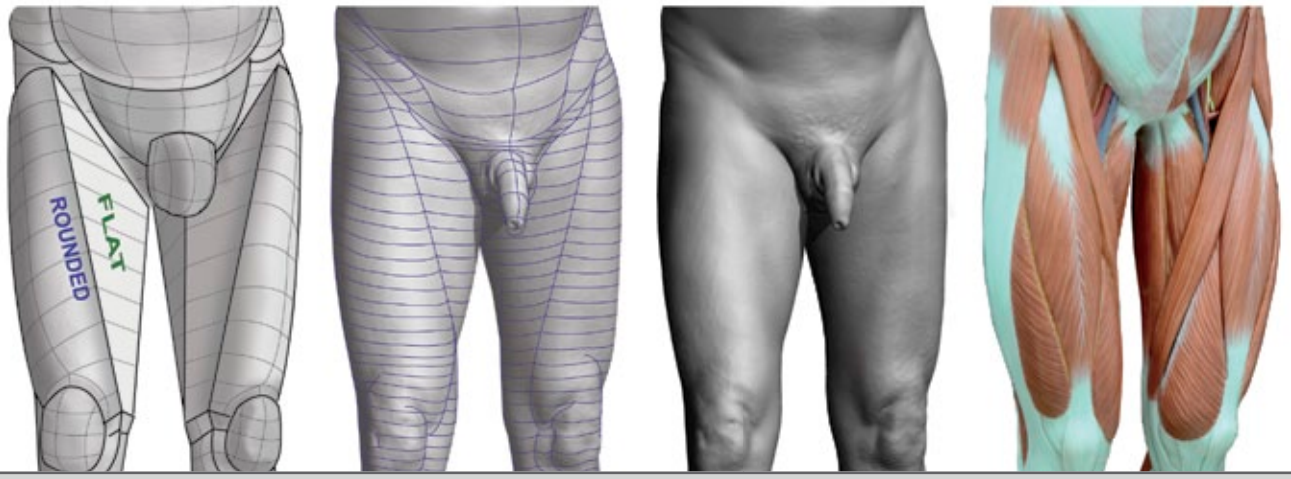


ACTION: FLEXION, ABDUCTION AND LATERAL ROTATION OF THE HIP, FLEXION OF THE KNEE

ORIGIN: 1 INFERIOR TO THE ANTERIOR SUPERIOR ILIAC SPINE

INSERTION: 2 ANTEROMEDIAL SURFACE OF THE UPPER TIBIA

SARTORIUS MUSCLE DIVIDES THIGH INTO TWO PLANES



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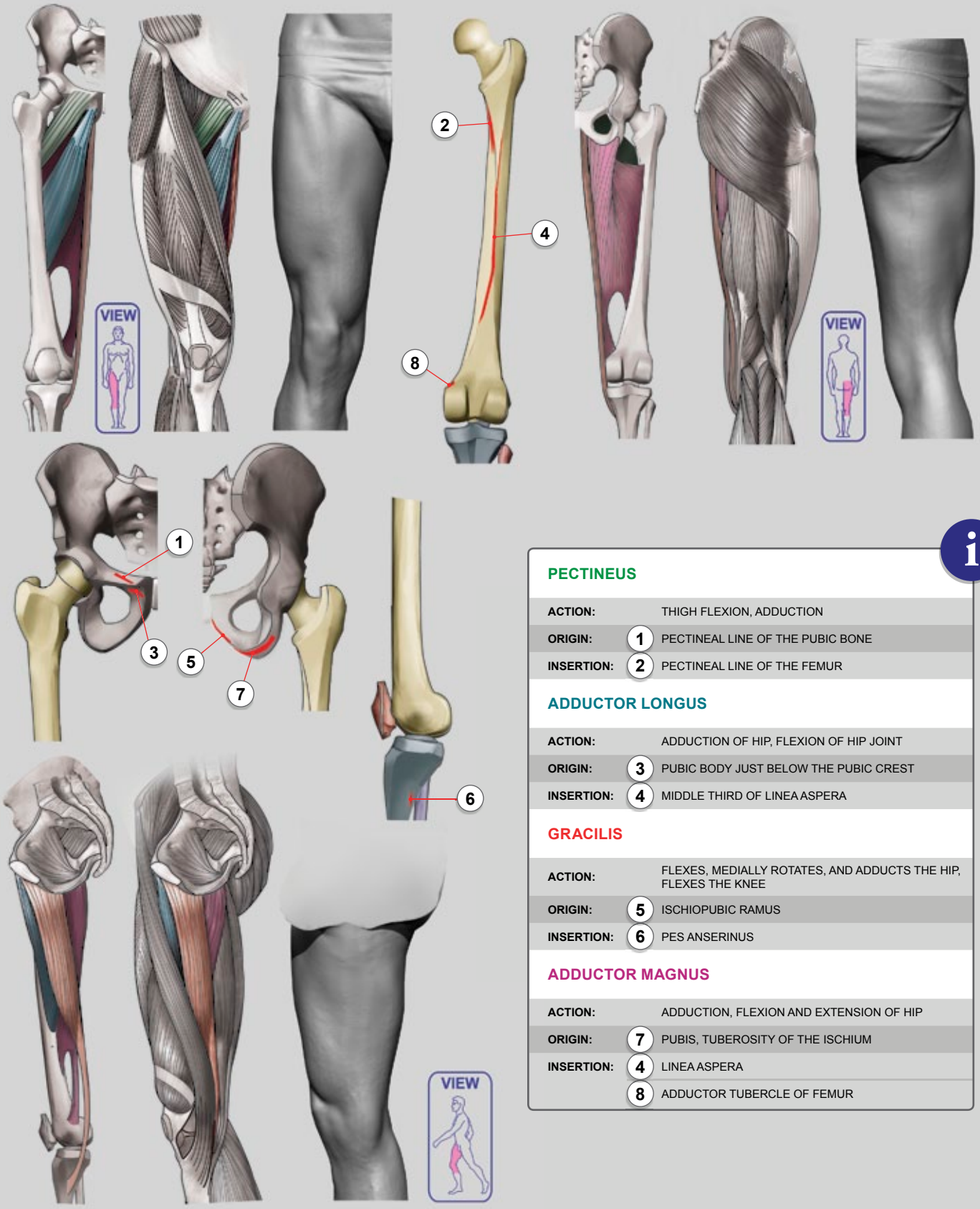
PECTINEUS, ADDUCTOR LONGUS, GRACILIS, AND ADDUCTOR MAGNUS

(ADDUCTOR MUSCLES OF THE HIP)



PECTINEUS

ACTION:		THIGH FLEXION, ADDUCTION
ORIGIN:	1	PECTINEAL LINE OF THE PUBIC BONE
INSERTION:	2	PECTINEAL LINE OF THE FEMUR

ADDUCTOR LONGUS

ACTION:		ADDUCTION OF HIP, FLEXION OF HIP JOINT
ORIGIN:	3	PUBIC BODY JUST BELOW THE PUBIC CREST
INSERTION:	4	MIDDLE THIRD OF LINEA ASPERA

GRACILIS

ACTION:		FLEXES, MEDIALLY ROTATES, AND ADDUCTS THE HIP, FLEXES THE KNEE
ORIGIN:	5	ISCHIOPUBIC RAMUS
INSERTION:	6	PES ANSERINUS

ADDUCTOR MAGNUS

ACTION:		ADDUCTION, FLEXION AND EXTENSION OF HIP
ORIGIN:	7	PUBIS, TUBEROSITY OF THE ISCHIUM
INSERTION:	4	LINEA ASPERA
	8	ADDUCTOR TUBERCLE OF FEMUR

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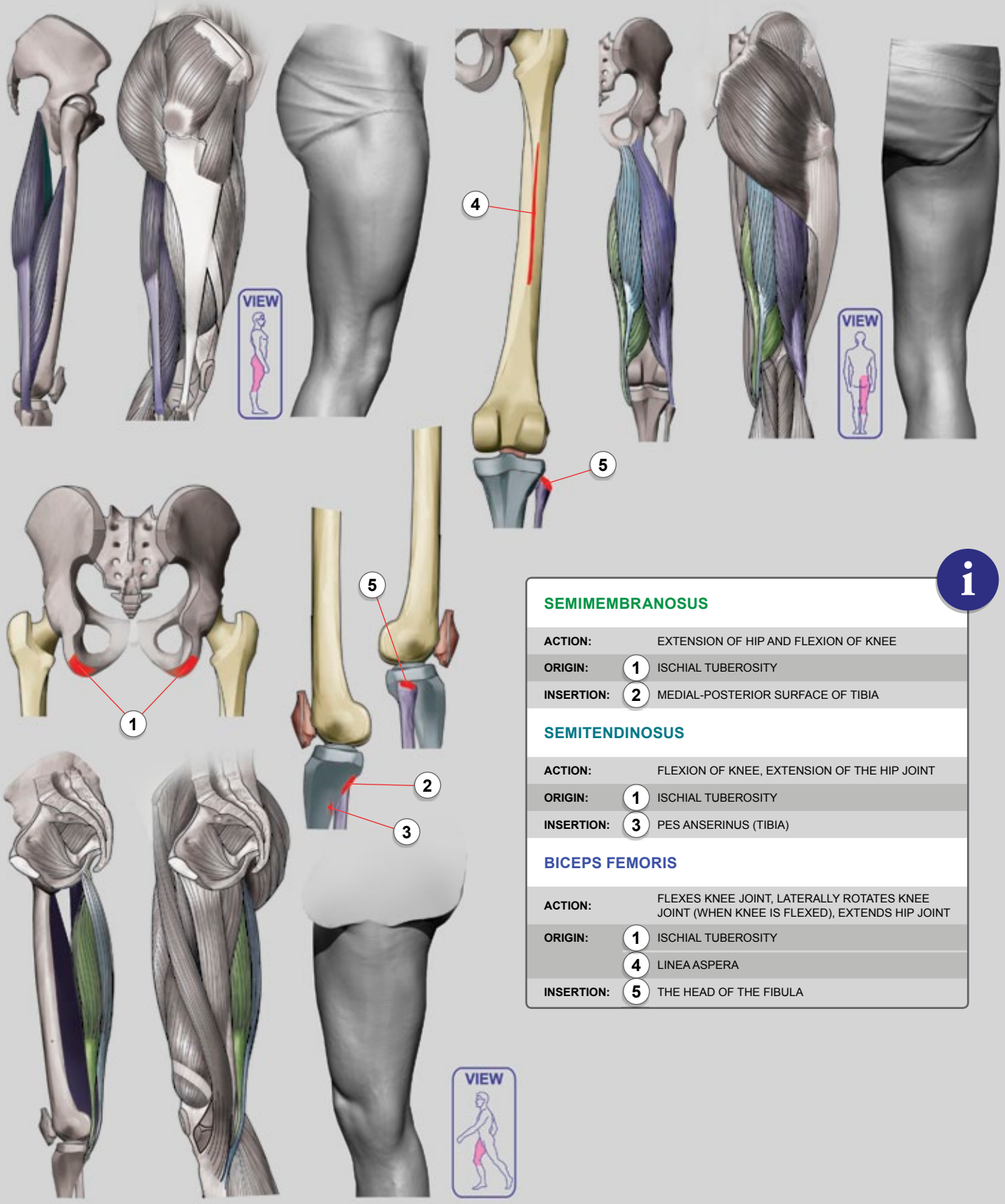
HAMSTRINGS

(FLEXORS OF THE THIGH)

SEMITENDINOSUS, SEMIMEMBRANOSUS AND BICEPS FEMORIS MUSCLES



SEMIMEMBRANOSUS

ACTION:		EXTENSION OF HIP AND FLEXION OF KNEE
ORIGIN:	1	ISCHIAL TUBEROSITY
INSERTION:	2	MEDIAL-POSTERIOR SURFACE OF TIBIA

SEMITENDINOSUS

ACTION:		FLEXION OF KNEE, EXTENSION OF THE HIP JOINT
ORIGIN:	1	ISCHIAL TUBEROSITY
INSERTION:	3	PES ANSERINUS (TIBIA)

BICEPS FEMORIS

ACTION:		FLEXES KNEE JOINT, LATERALLY ROTATES KNEE JOINT (WHEN KNEE IS FLEXED), EXTENDS HIP JOINT
ORIGIN:	1	ISCHIAL TUBEROSITY
	4	LINEA ASPERA
INSERTION:	5	THE HEAD OF THE FIBULA

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CALVES

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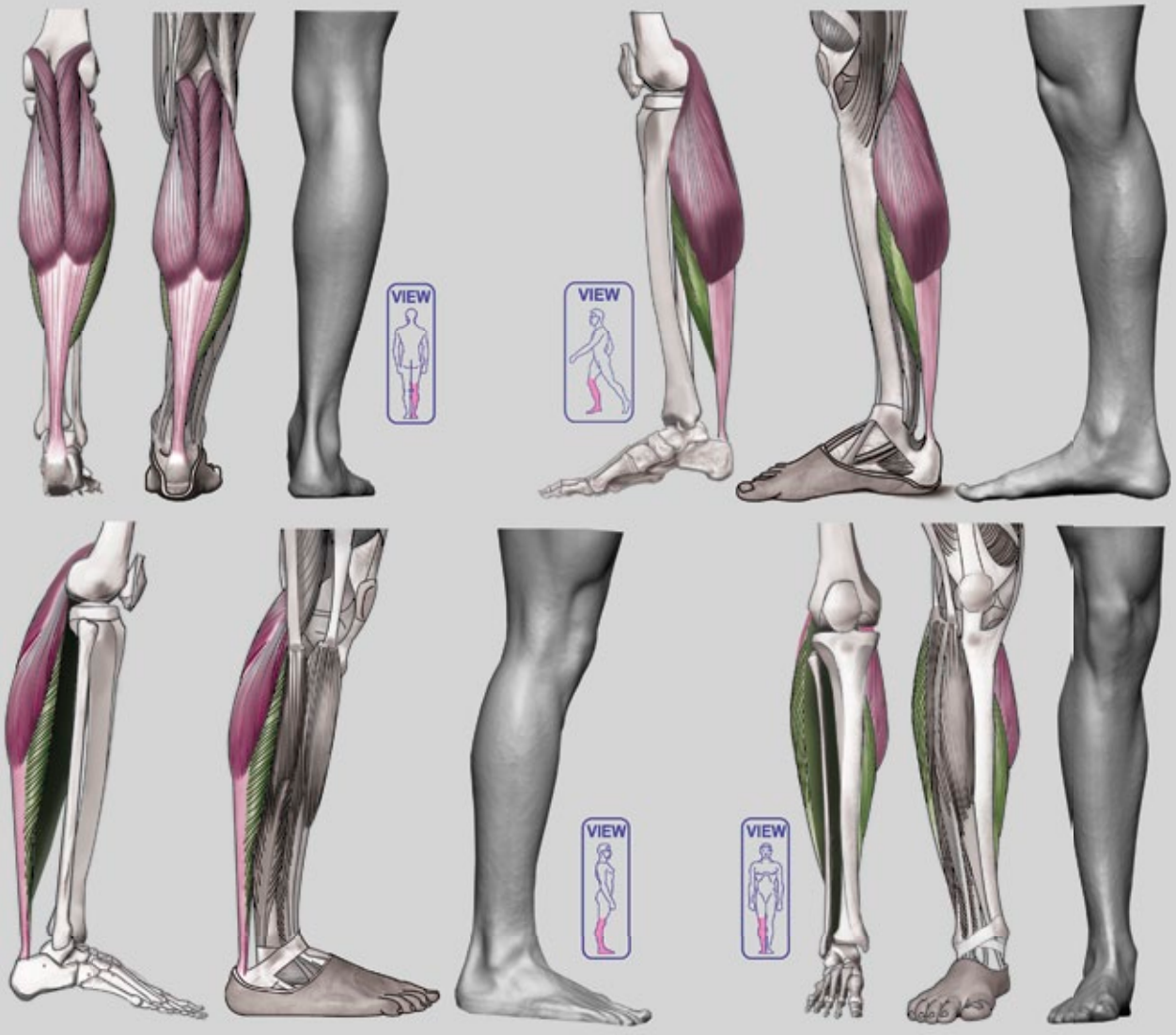
THE CALF

(GASTROCNEMIUS AND SOLEUS MUSCLES)



GASTROCNEMIUS MUSCLE IS THE LARGER CALF MUSCLE, FORMING A BULGE VISIBLE BENEATH THE SKIN. **THE GASTROCNEMIUS** HAS TWO PARTS OR "HEADS", WHICH TOGETHER CREATE ITS DIAMOND SHAPE. **THE SOLEUS** IS A SMALLER, FLAT MUSCLE THAT LIES UNDERNEATH THE **GASTROCNEMIUS** MUSCLE. CONNECTIVE TISSUE AT THE BOTTOM OF THE CALF MUSCLE MERGES WITH THE ACHILLES TENDON. THE ACHILLES TENDON INSERTS INTO THE HEEL BONE (CALCANEUS).

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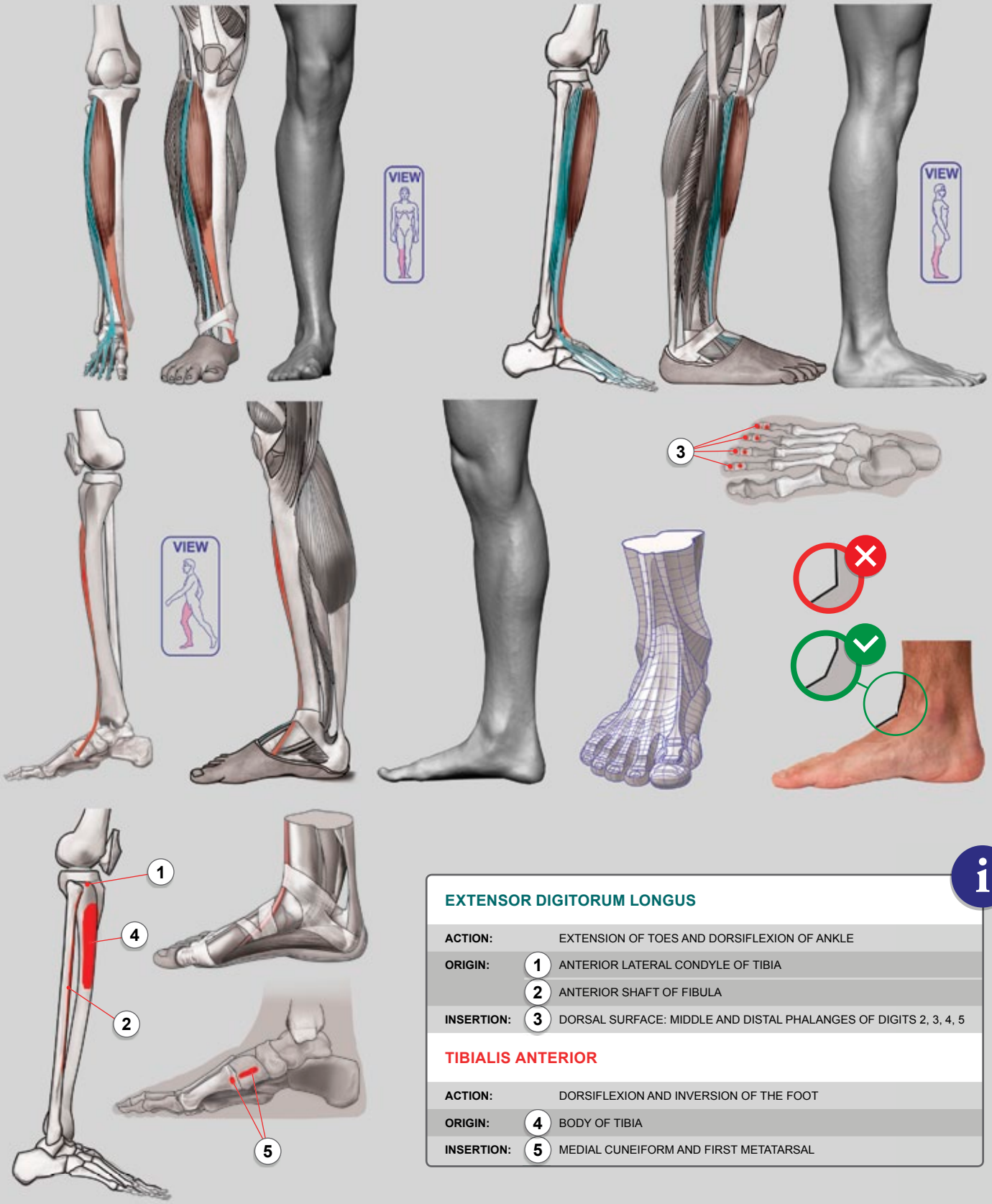
EXTENSOR DIGITORUM LONGUS AND TIBIALIS ANTERIOR MUSCLES



EXTENSOR DIGITORUM LONGUS

ACTION:		EXTENSION OF TOES AND DORSIFLEXION OF ANKLE
ORIGIN:	1	ANTERIOR LATERAL CONDYLE OF TIBIA
	2	ANTERIOR SHAFT OF FIBULA
INSERTION:	3	DORSAL SURFACE: MIDDLE AND DISTAL PHALANGES OF DIGITS 2, 3, 4, 5

TIBIALIS ANTERIOR

ACTION:		DORSIFLEXION AND INVERSION OF THE FOOT
ORIGIN:	4	BODY OF TIBIA
INSERTION:	5	MEDIAL CUNEIFORM AND FIRST METATARSAL

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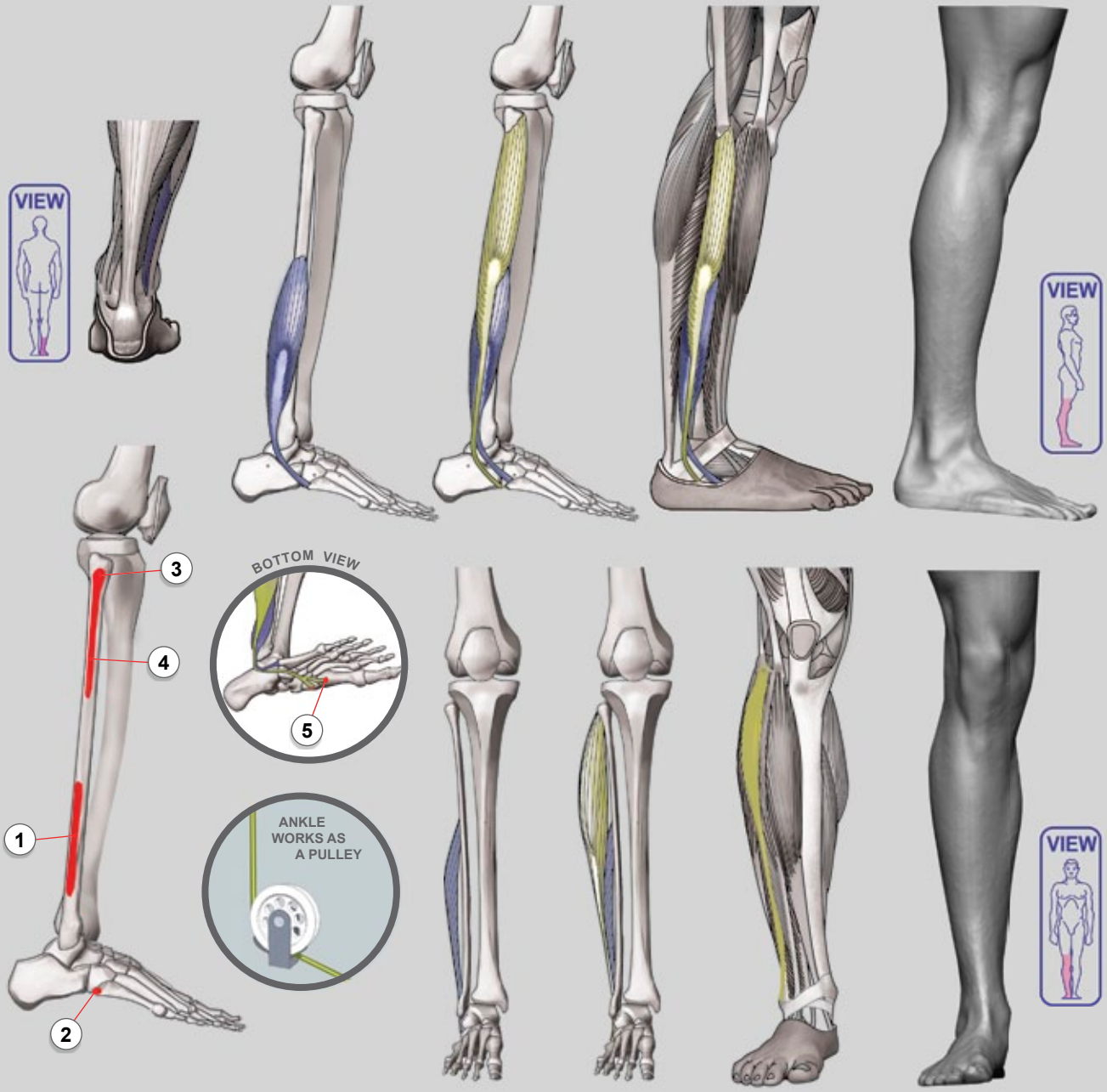
PERONEUS BREVIS AND PERONEUS LONGUS MUSCLES



PERONEUS BREVIS		PERONEUS LONGUS	
ACTIONS:	EVERTS AND PLANTAR FLEXES THE FOOT	**ACTIONS:**	EVERTS AND PLANTAR FLEXES THE FOOT, MAINTAINS THE ARCH OF THE FOOT
ORIGIN:	1 LOWER 2/3 OF THE LATERAL FIBULA	**ORIGIN:**	3 HEAD OF FIBULA
			4 UPPER 2/3 OF THE SHAFT OF FIBULA
INSERTION:	2 ENLARGED BASE OF THE 5TH METATARSAL	**INSERTION:**	5 UNDER THE FOOT INTO THE BASE OF THE 1st. METATARSAL BONE, AND MEDIAL CUNEIFORM

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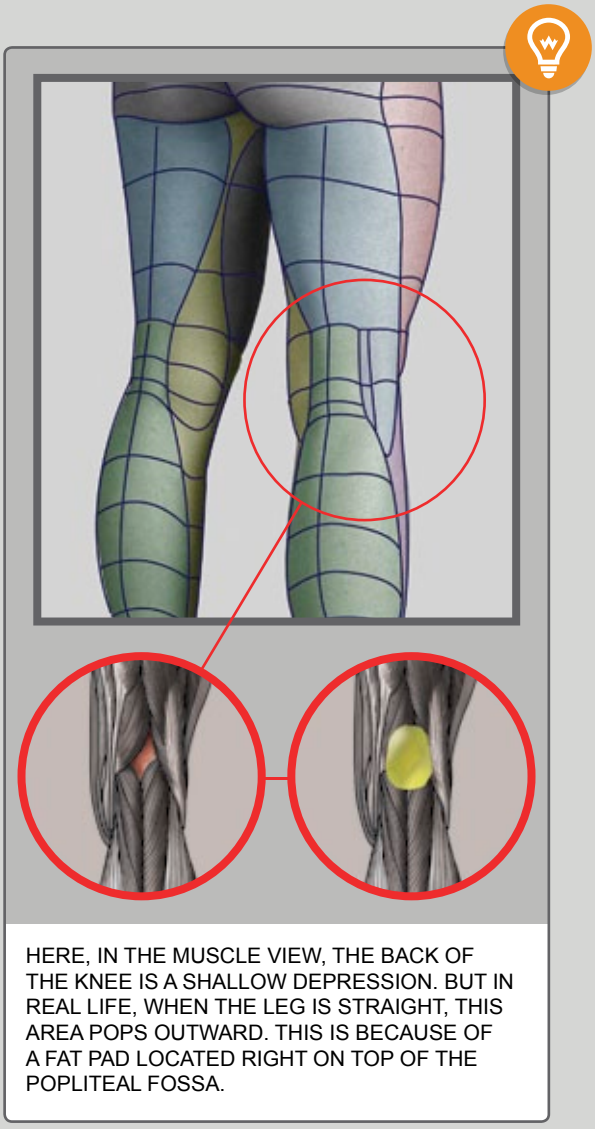
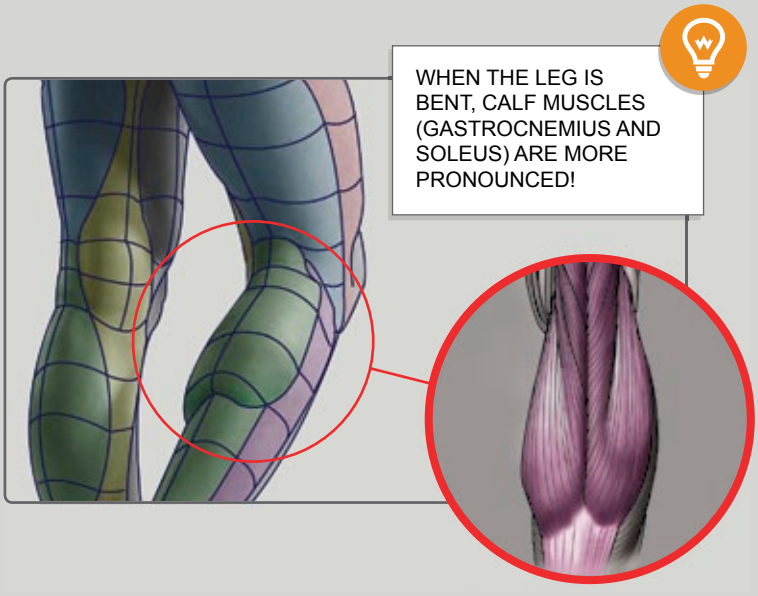
TIPS FOR BACKSIDE OF LEGS



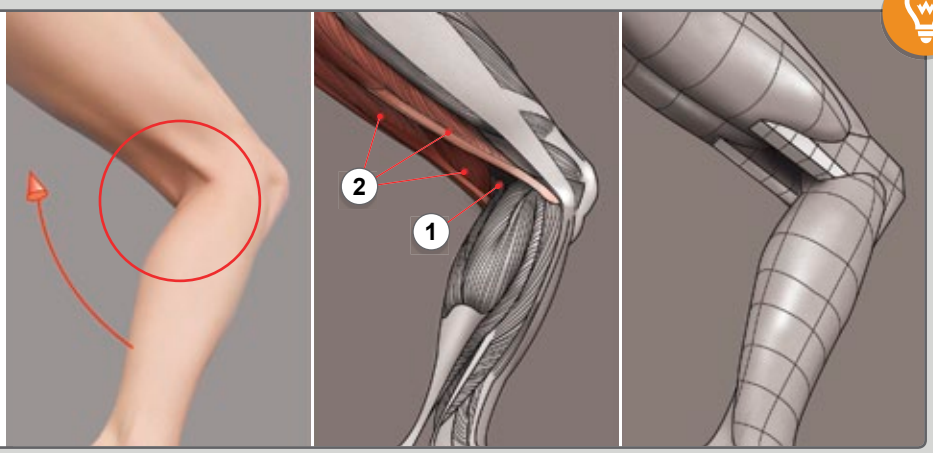
HERE, IN THE MUSCLE VIEW, THE BACK OF THE KNEE IS A SHALLOW DEPRESSION. BUT IN REAL LIFE, WHEN THE LEG IS STRAIGHT, THIS AREA POPS OUTWARD. THIS IS BECAUSE OF A FAT PAD LOCATED RIGHT ON TOP OF THE POPLITEAL FOSSA.



WHEN THE LEG IS BENT, CALF MUSCLES (GASTROCNEMIUS AND SOLEUS) ARE MORE PRONOUNCED!

AS THE LEG IS BENT FURTHER, THE DEPRESSION, CALLED THE POPLITEAL FOSSA (THE KNEE PIT), BECOMES DEEPER.

1. FOSSA (THE KNEE PIT) BECOMES PROMINENT
2. **HAMSTRING MUSCLES**



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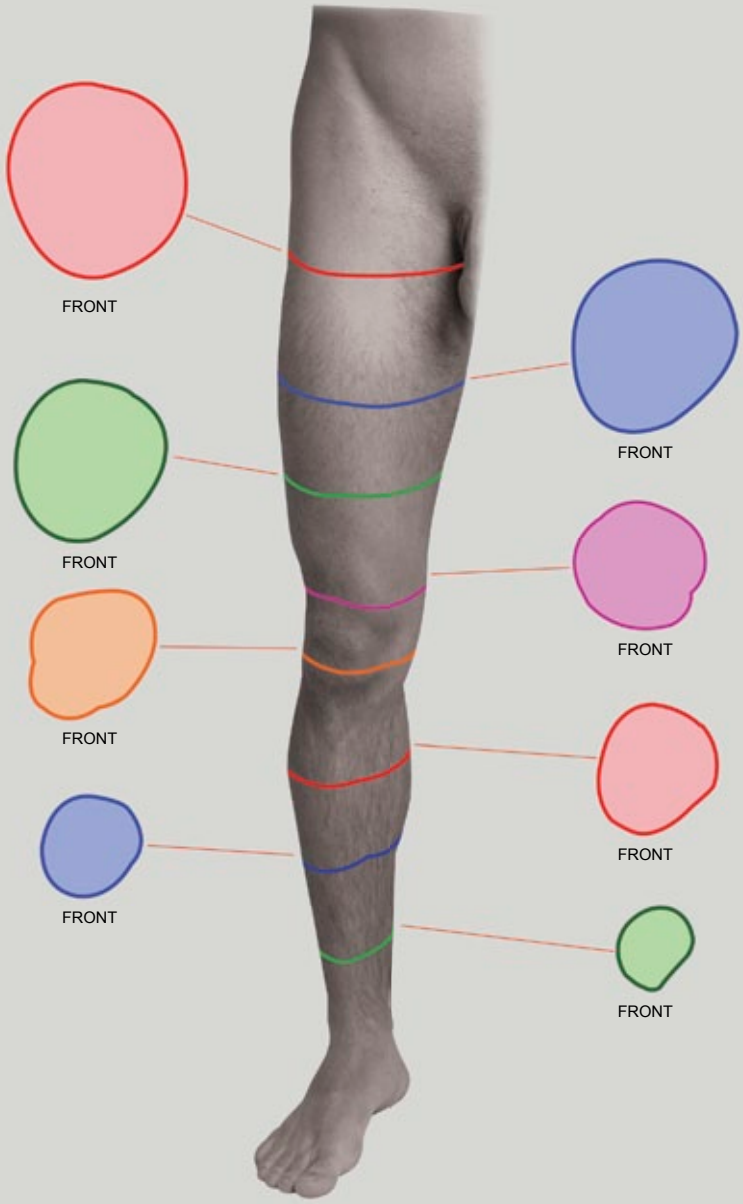
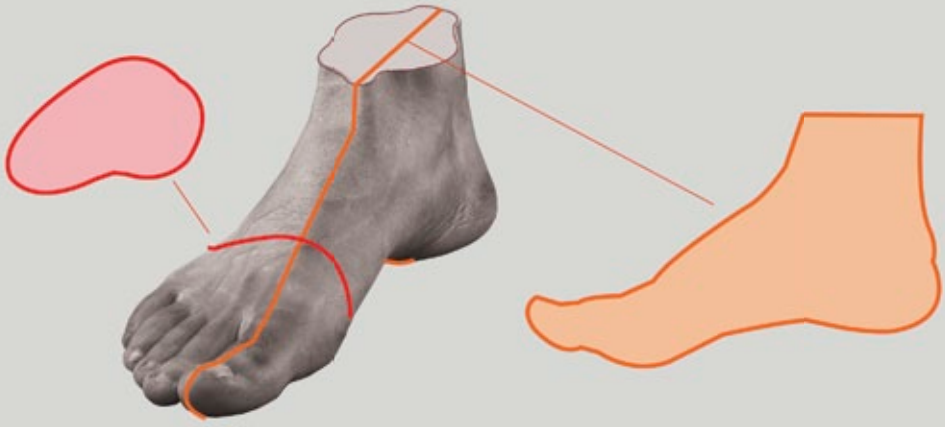
CROSS SECTION OF THE LOWER LIMB

THE MEDIAL SURFACE OF THE TIBIA IS NOT COVERED BY MUSCLES, THEREFORE IT IS A GOOD BONY LANDMARK. IN THE LOWER PART, IT TURNS TO MEDIAL ANKLE.





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KNEE MECHANICS

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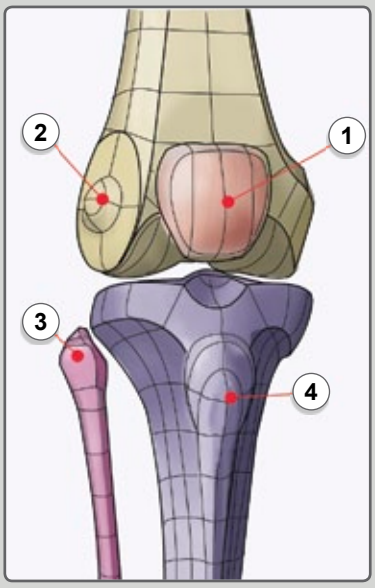
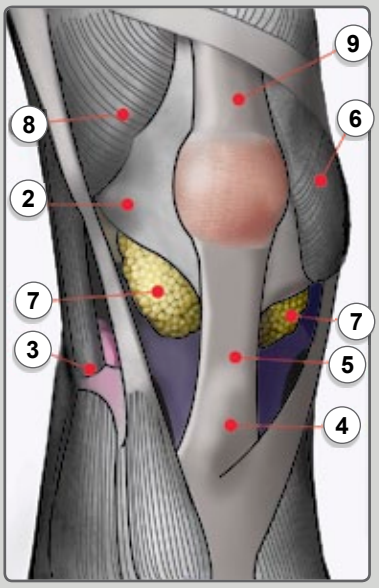
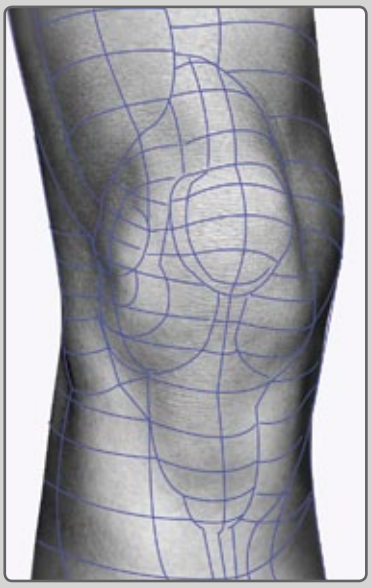
THE KNEE

(WHAT ARE THESE BUMPS?)

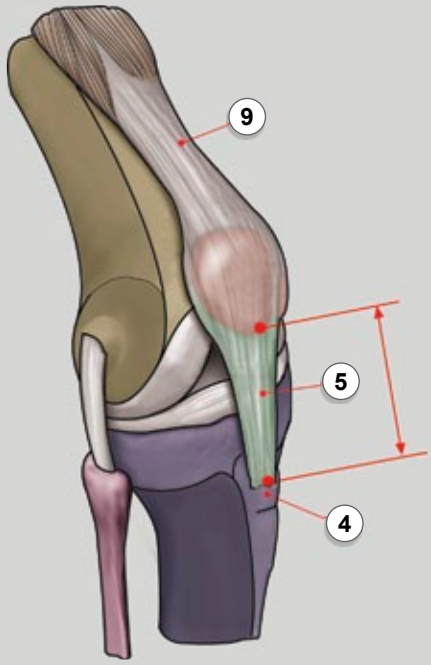




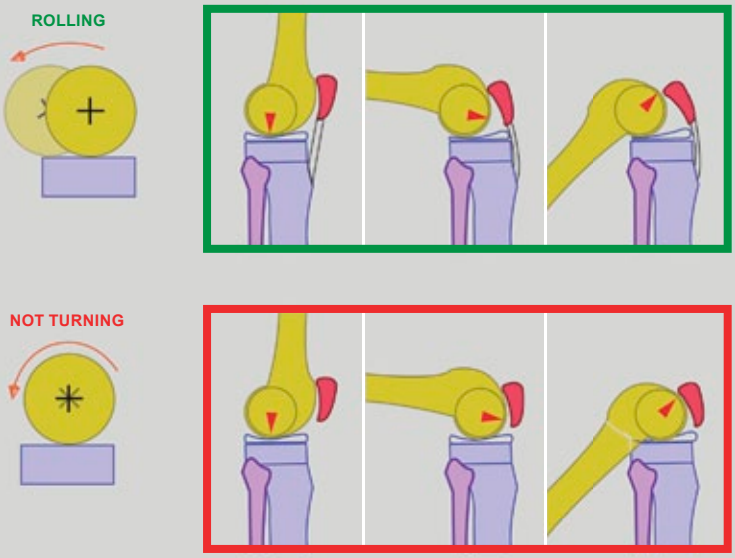


1	KNEE CAP (PATELLA)	4	TIBIAL TUBEROSITY	7	INFRAPATELLAR FAT PAD
2	LATERAL EPICONDYLE OF FEMUR	5	PATELLAR LIGAMENT	8	VASTUS LATERALIS
3	HEAD OF FIBULA	6	VASTUS MEDIALIS	9	QUADRICEPS TENDON

PATELLAR LIGAMENT (5) DO NOT STRETCH LIKE TENDONS (9) SO THE DISTANCE BETWEEN KNEE CAP AND TIBIAL TUBEROSITY (4) REMAINS CONSISTENT.



THE HEAD OF THE **FEMUR** IS **ROLLING** OVER THE TOP OF THE **TIBIA**, **NOT TURNING**.



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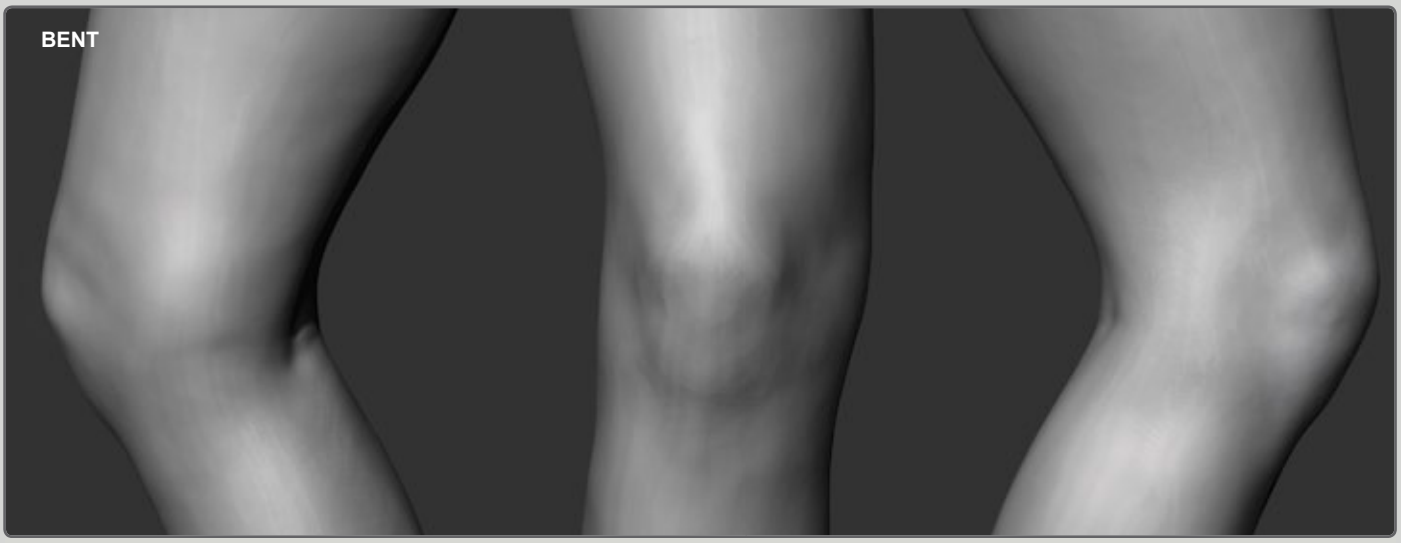
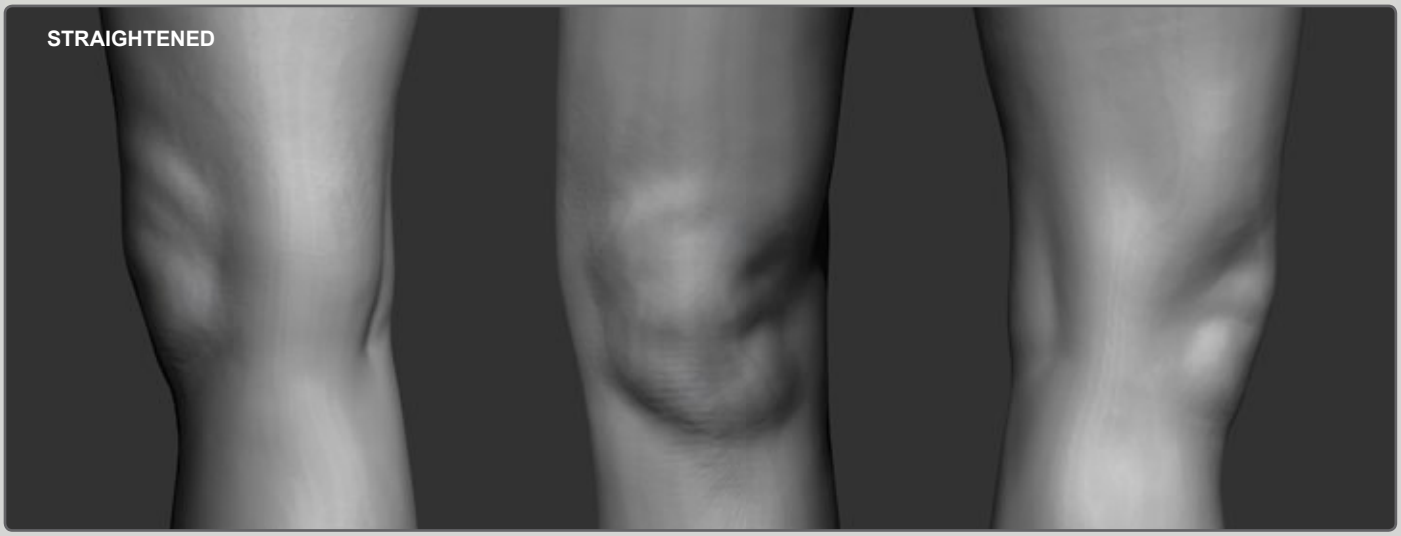
3D SCAN OF RIGHT KNEE





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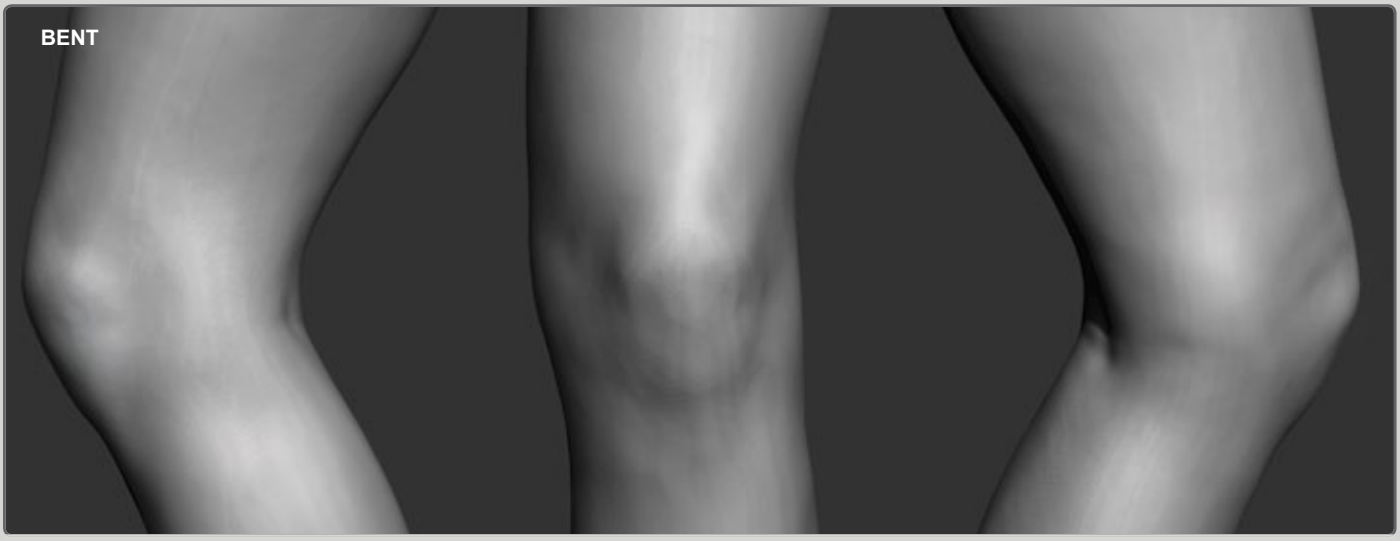
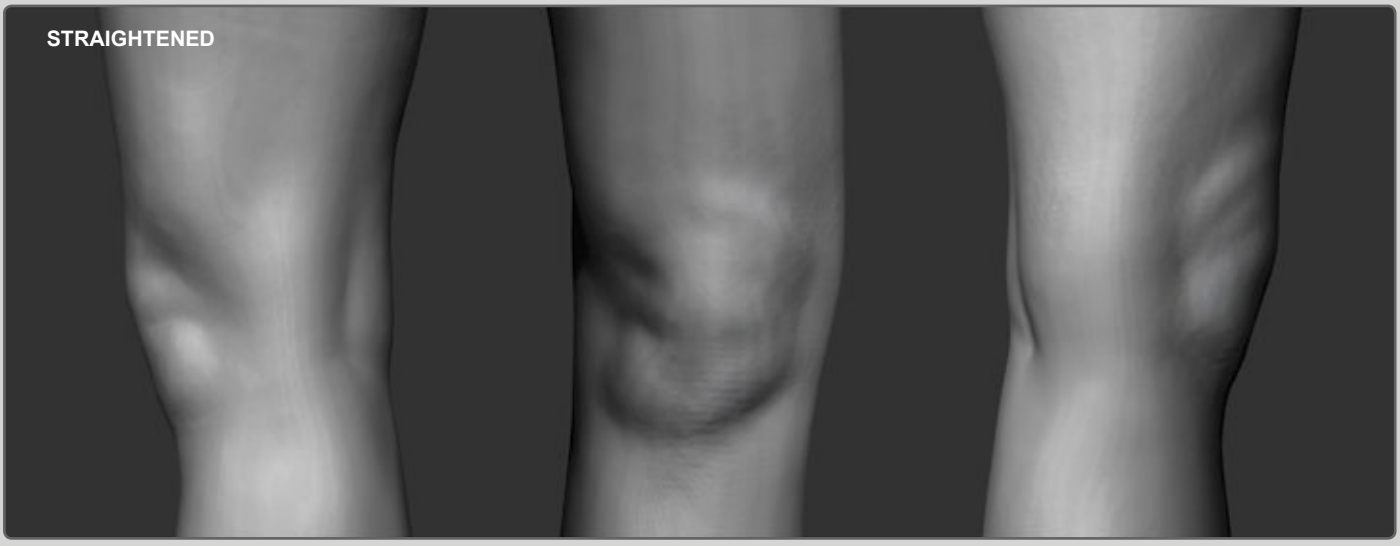
3D SCAN OF LEFT KNEE





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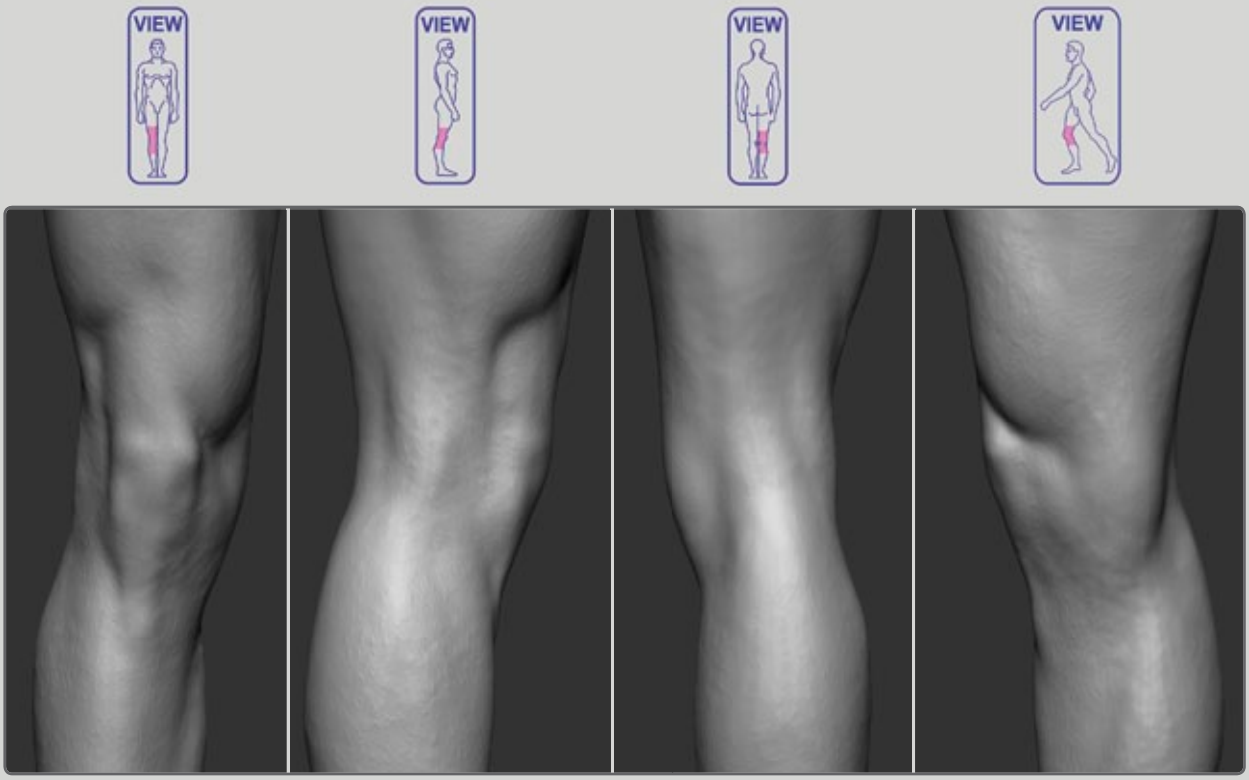
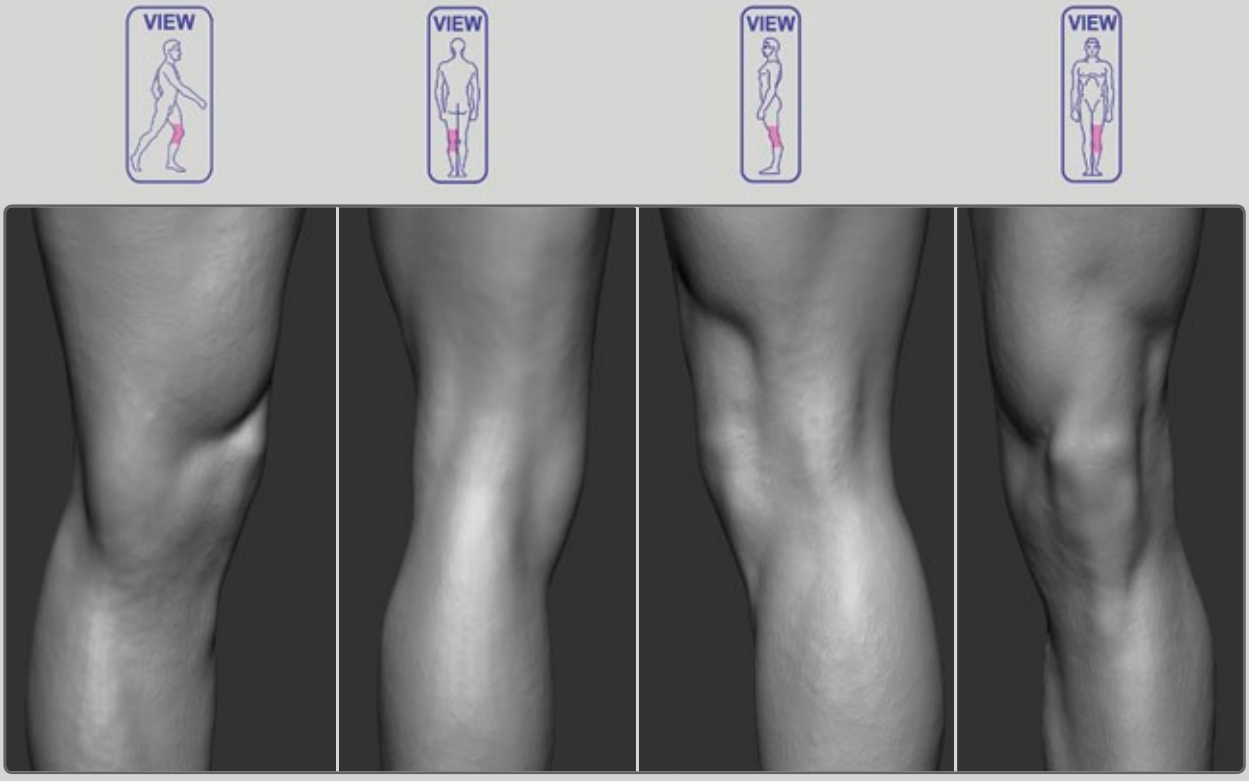
3D SCAN OF LEFT AND RIGHT KNEES





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FEMALE LEGS

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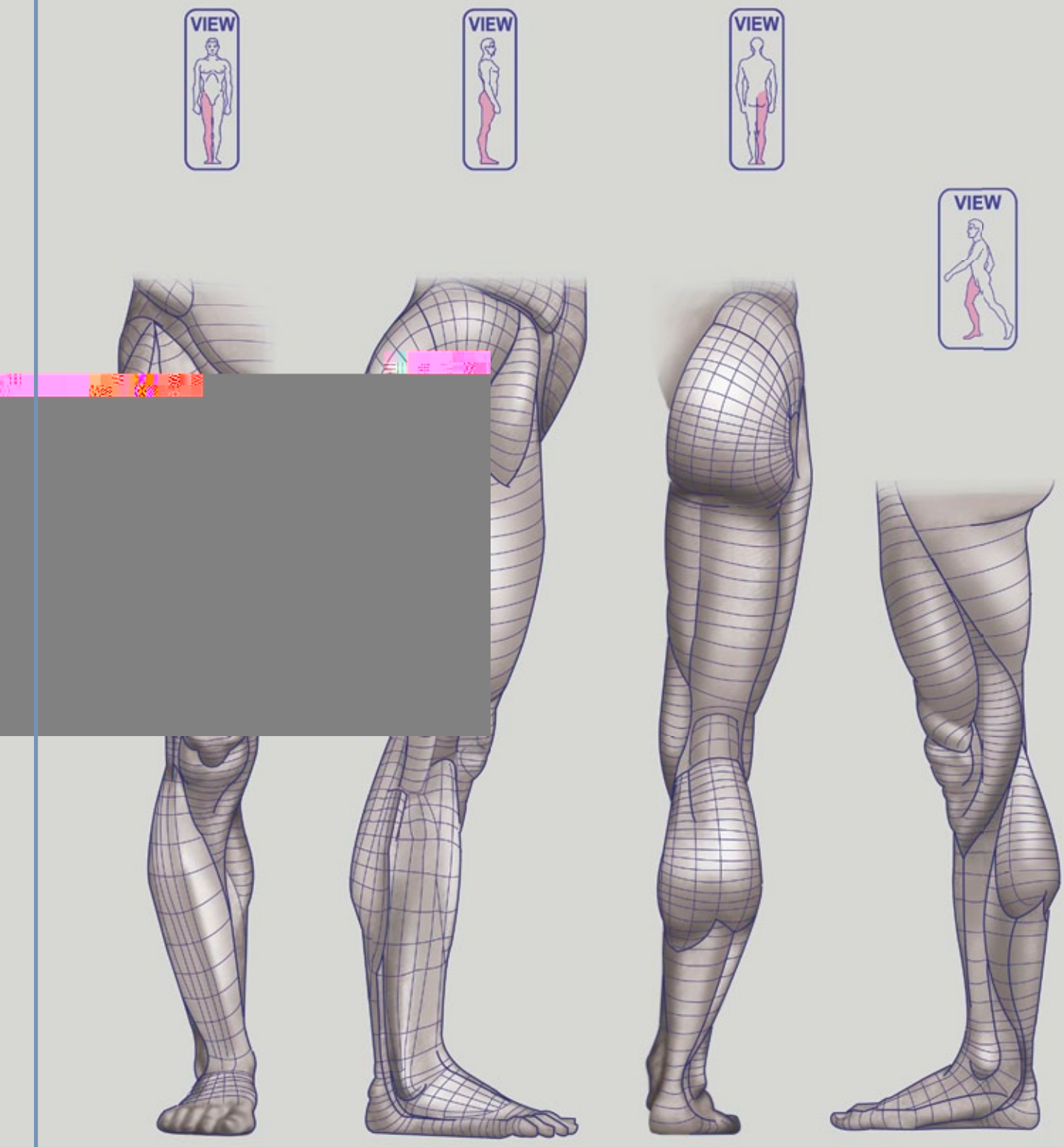
LEG SHAPES VIEWED FROM ALL SIDES



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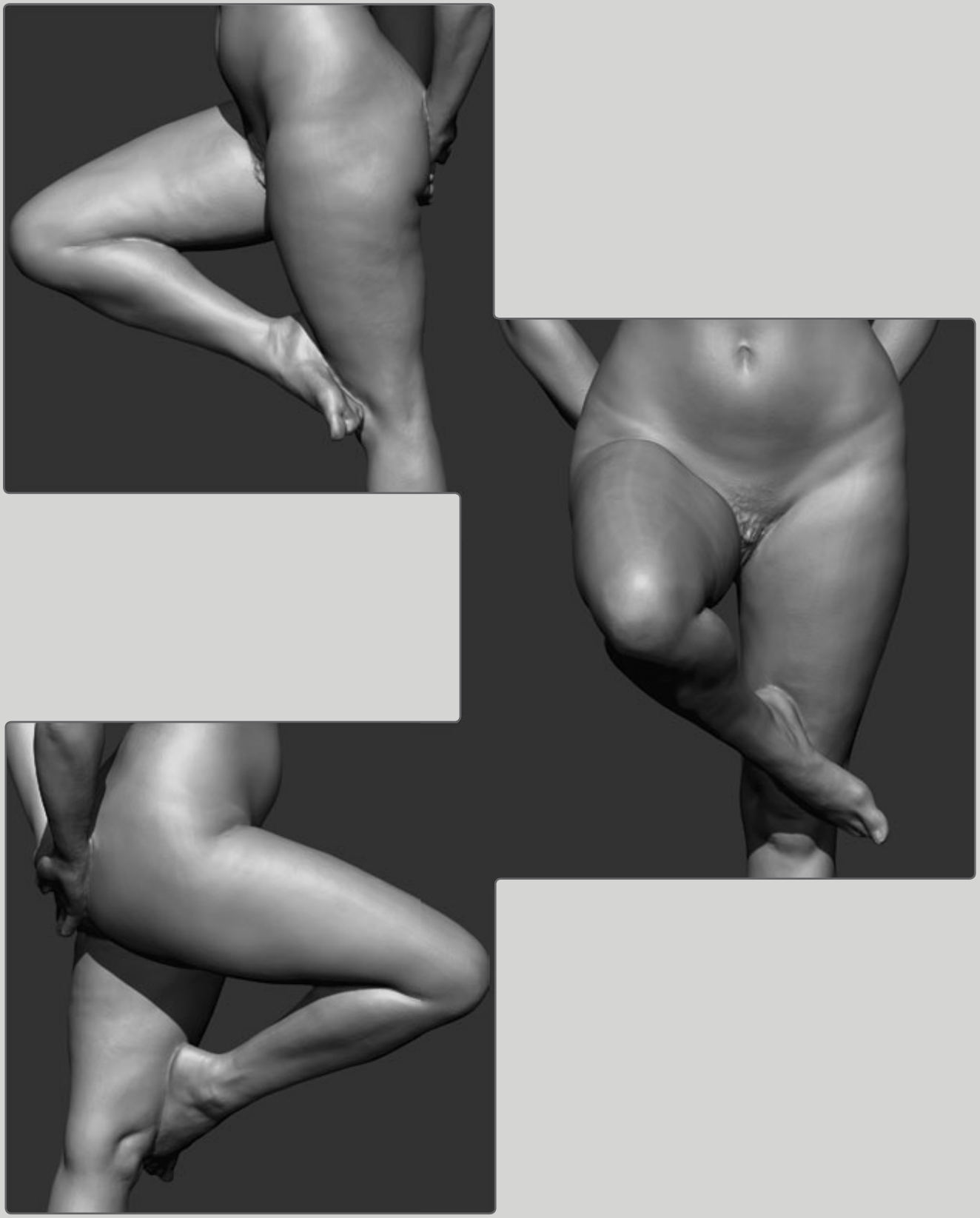
3D SCAN OF LOWER LIMB



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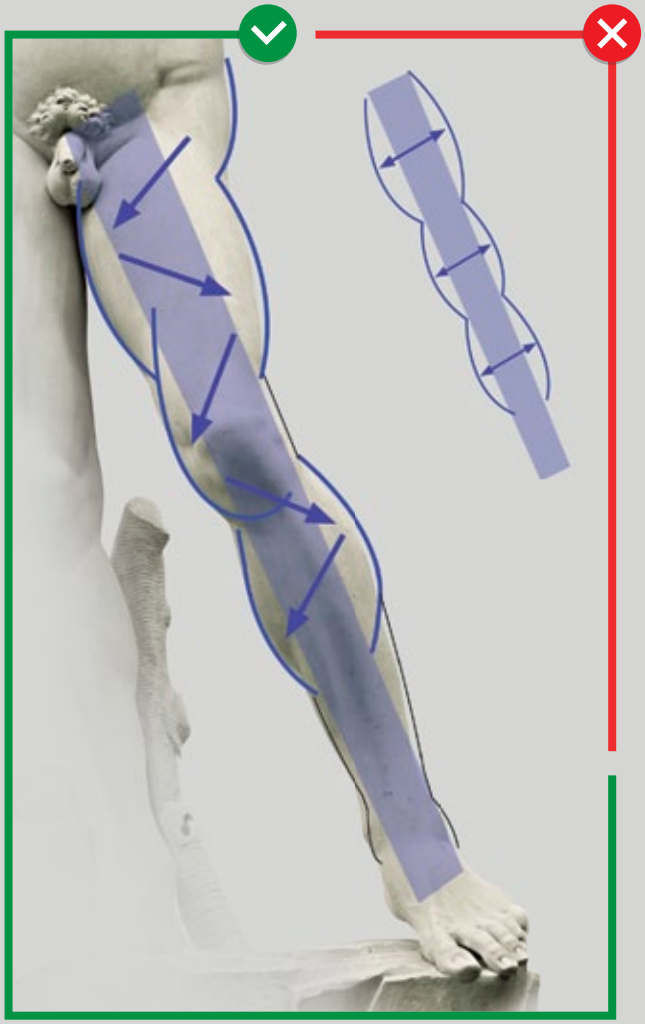
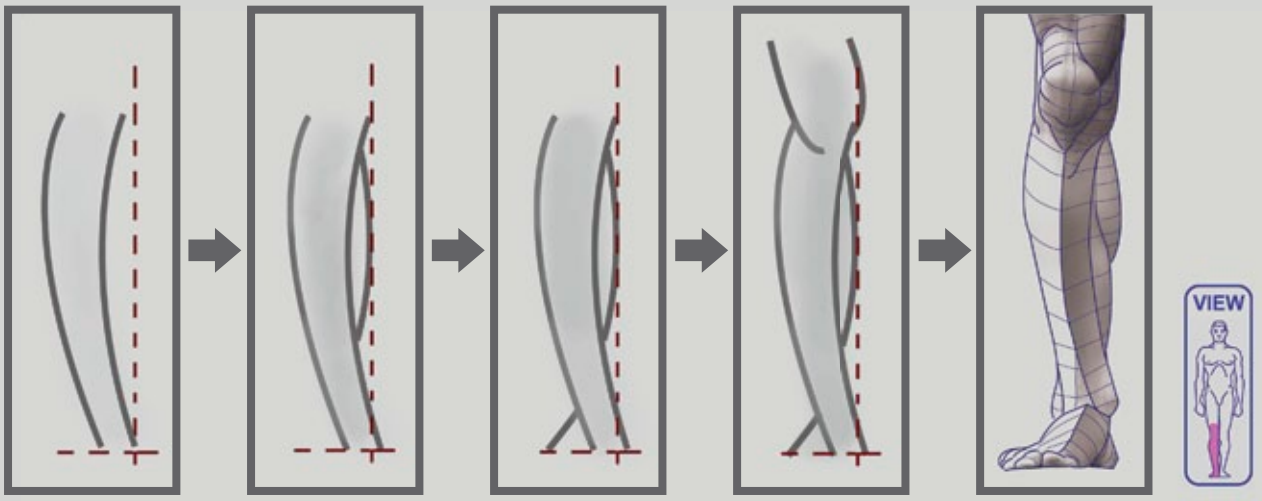
MUSCLES TRAVERSING DOWN THE LOWER LIMB





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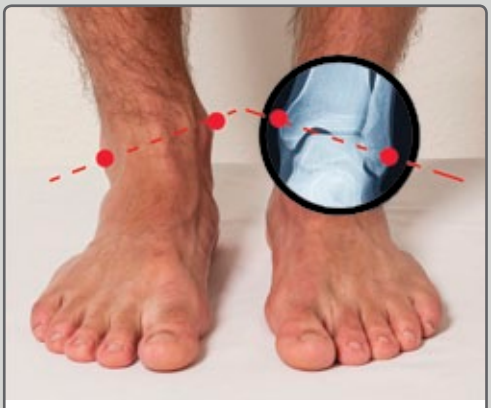
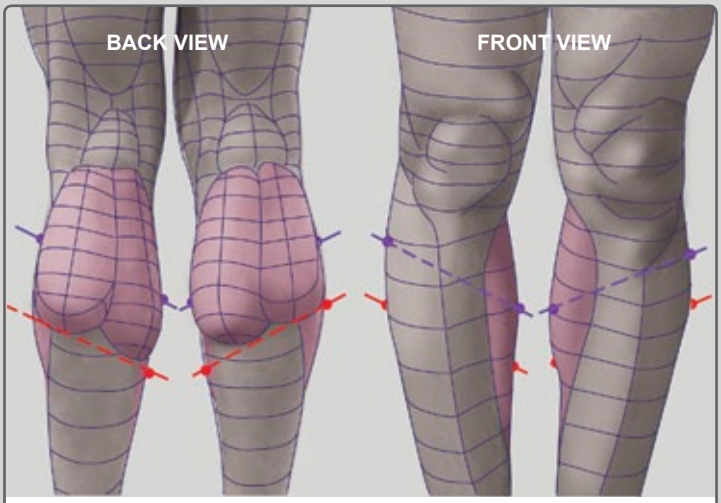
ADDITIONAL SHAPES OF THE LEG AND FOOT

HEEL IS MOSTLY SHAPED BY **FAT PAD**.



THE INNER ANKLE CURVE IS HIGHER THAN THE OUTER ANKLE CURVE.



INNER PORTIONS OF THE CALF MUSCLES ARE LOCATED LOWER AND SHAPES ARE MORE ROUND AND MASSIVE THAN THE OUTER PORTION.

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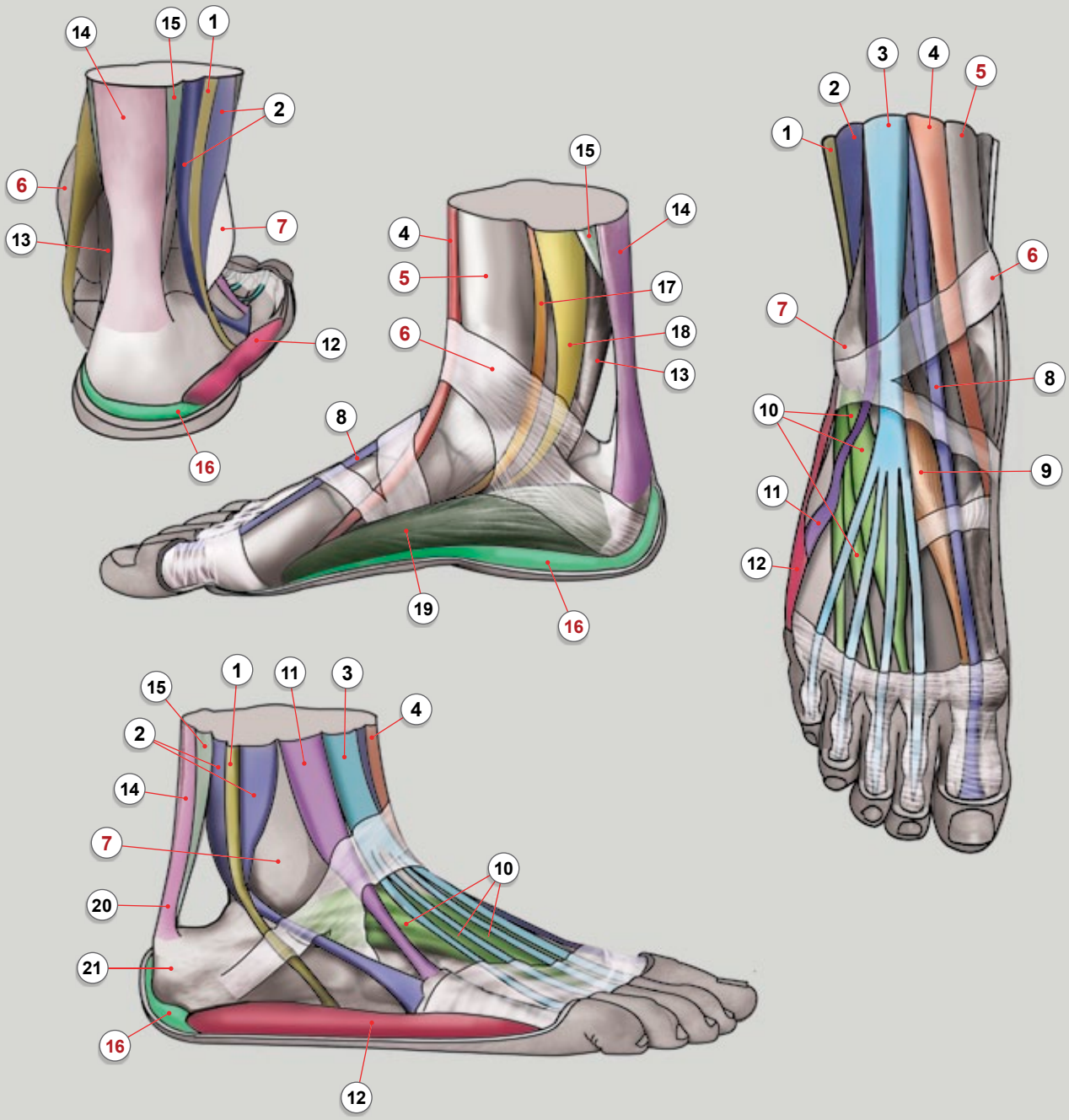
FOOT MUSCLES



1	PERONEUS LONGUS	8	EXTENSOR HALLUCIS LONGUS	15	SOLEUS
2	PERONEUS BREVIS	9	EXTENSOR HALLUCIS BREVIS	16	FAT PAD
3	EXTENSOR DIGITORUM LONGUS	10	EXTENSOR DIGITORUM BREVIS	17	TIBIALIS POSTERIOR
4	TIBIALIS ANTERIOR	11	PERONEUS TERTIUS	18	FLEXOR DIGITORUM LONGUS
5	MEDIAL SURFACE OF TIBIA BONE	12	ABDUCTOR DIGITI MINIMI	19	ABDUCTOR HALLUCIS
6	MEDIAL ANKLE (M. MALLEOLUS)	13	FLEXOR HALLUCIS LONGUS	20	ACHILLES TENDON
7	LATERAL ANKLE (L. MALLEOLUS)	14	GASTROCNEMIUS	21	CALCANEUS BONE

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FOOT SHAPES

RIGHT FOOT

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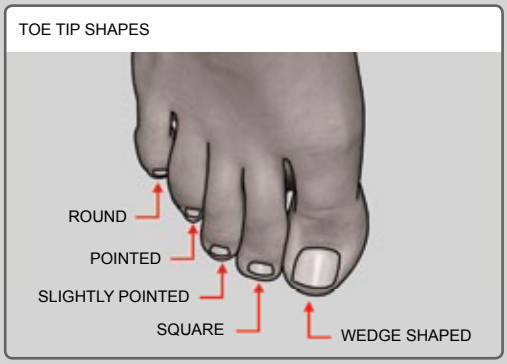
FOOT SHAPES AND FORMING A FOOT



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BLOCKING OUT A FOOT

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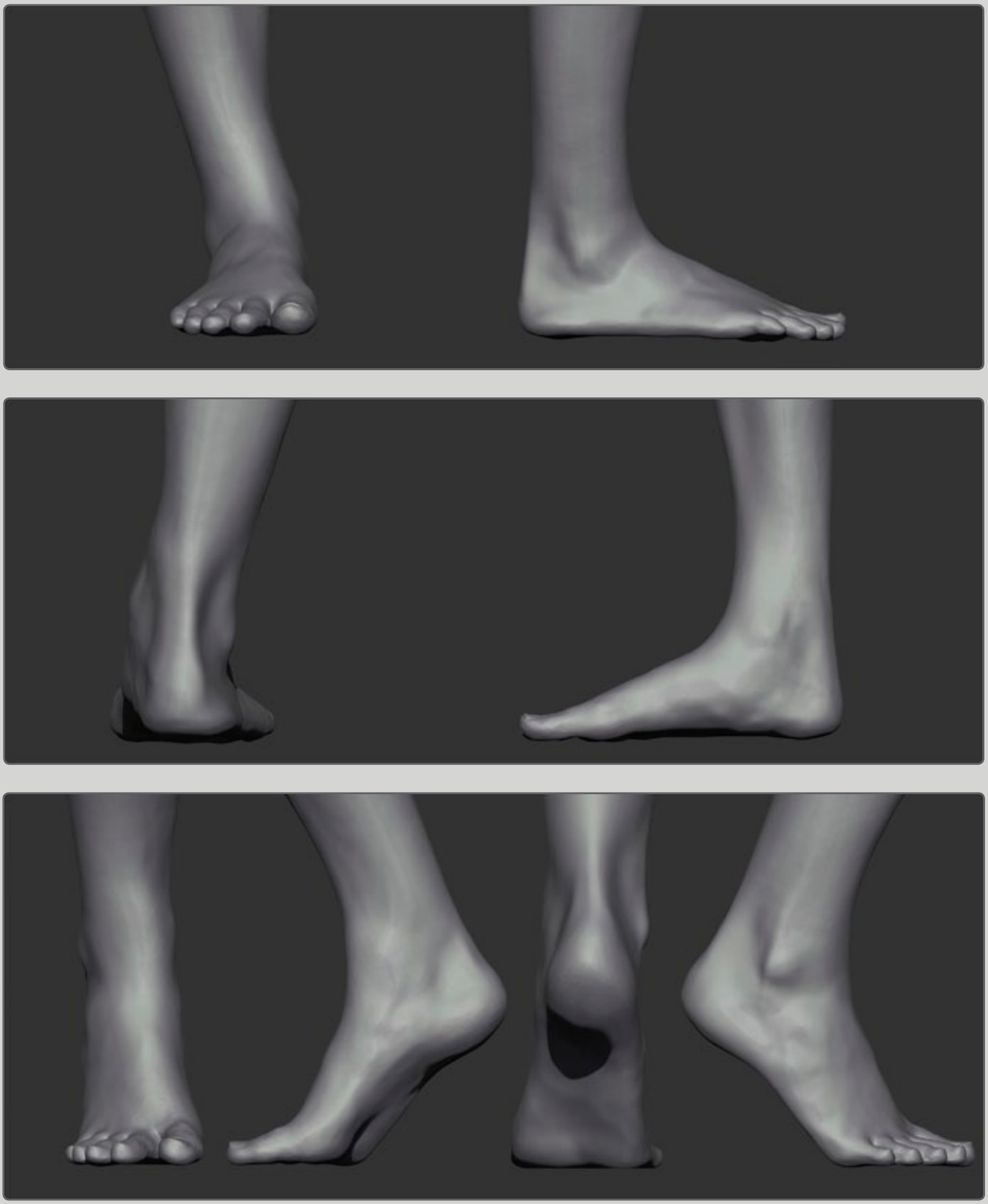
3D SCAN OF RIGHT FOOT



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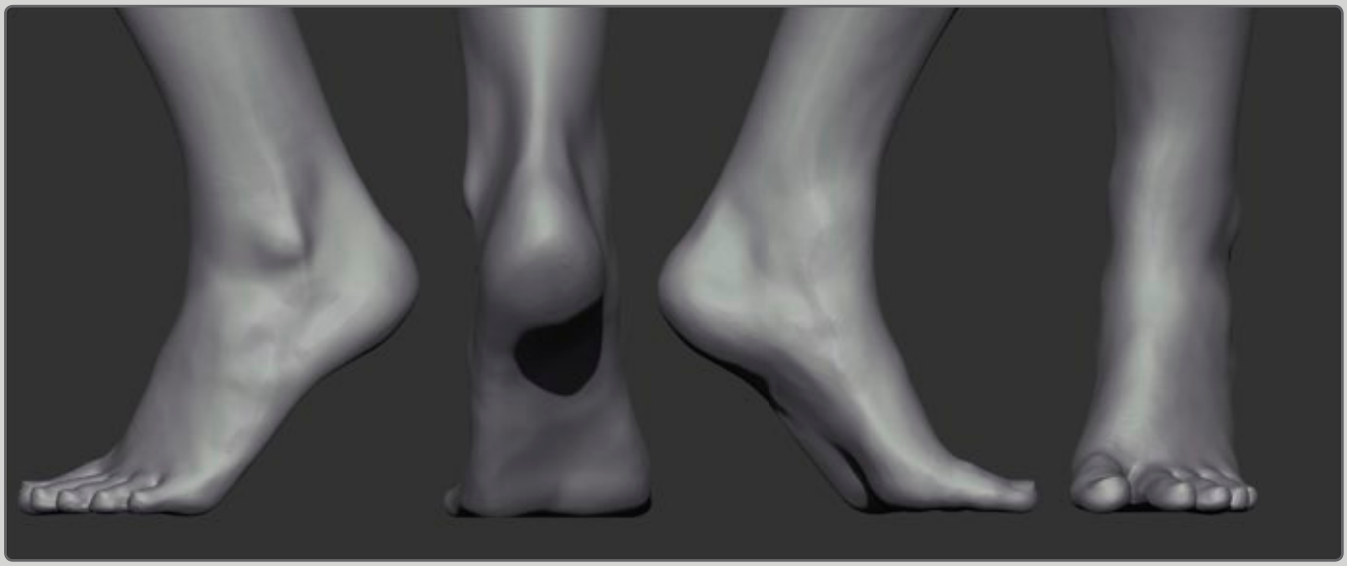
3D SCAN OF LEFT FOOT



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BABY FEET

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